



**RCRA PART B PERMIT APPLICATION CHECKLIST COMMENTS**  
REVISED 1/99

**A.            PART A APPLICATION:    329 IAC 3.1-13-3, 40 CFR 270.11(a) and (d), 270.13**

Include a signed copy of the facility's most recent Part A Application

**B.            FACILITY DESCRIPTION**

**B-1           General Description: 40 CFR 270.14(b)(1)**

Provide a brief description of the facility, including the nature of the business. Off-site facilities should identify the types of industries served; on-site facilities should briefly describe the process(es) involved in the generation of hazardous waste.

**B-2           Topographic Map**

**B-2a          General Requirements: 40 CFR 270.14(b)(19)**

Submit a topographic map that shows the facility and a distance of 1,000 feet around it at a scale of 1 inch equal to not more than 200 feet. The map must include contours sufficient to show surface water flow in the vicinity of and from each operational unit (e.g., contours 5 feet if relief is greater than 20 feet; contours of 2 feet if the relief is less than 20 feet). The map must include map date, 100-year floodplain area, surface waters, surrounding land uses, a wind rose, map orientation, and legal boundaries of facility site. The map must also indicate the location of access control, injection, and withdrawal wells, buildings, structures, sewers (storm, sanitary and process), loading and unloading areas, fire control facilities, flood control or drainage barriers, run-off control systems, and (proposed) new and existing hazardous waste management units and solid waste management units.

Note: Multiple maps may be submitted, but all must be at a scale of 1 inch equal to not more than 200 feet.

**B-2b          Additional Requirements for Land Disposal Facilities: 40 CFR 270.14(c)(3) and (4)(i), 264.95, 264.97**

The topographic map also must indicate the waste management area boundaries, the property boundaries, the proposed point of compliance, the proposed groundwater monitoring well locations, the locations of the uppermost aquifer and aquifer hydraulically interconnected beneath the facility (including flow direction and rate), and

if present, the extent of the plume of contamination that has entered the groundwater from a regulated unit.

Note: Multiple maps may be submitted, but all must be at a scale of 1 inch equal to not more than 200 feet.

B-3            Location Information: 40 CFR 270.14(b)(11)

B-3a           Seismic Standard: 40 CFR 270.14(b)(11)(i) and (ii), 264.18(a), Part 264 Appendix VI

New facilities must identify the political jurisdiction (county, township, or election district) in which the facility will be located. If the facility will be located in an area listed in Part 264 Appendix VI, prove that the facility is located at least 3,000 feet from any faults that have had displacement in Holocene time or that no such faults pass within 200 feet of proposed hazardous waste treatment, storage or disposal areas. Proof may be based on geologic studies, serial photographs, field observations, or subsurface investigations. All information must be acceptable to a geologist experienced in evaluation seismic activity.

B-3b           Floodplain Standard: 40 CFR 270.14(b)(11)(iii), 264.18(b)

Document whether or not the facility is located within a 100-year floodplain, and include the source of data (Federal Insurance Administration Map or equivalent maps and calculations).

B-3b(1)       Demonstration of Compliance: 40 CFR 270.14(b)(11)(iv), 264.18(b)

For facilities located within the 100-year floodplain, describe how the facility is designed, constructed, operated, and maintained to prevent washout of any hazardous waste during a flood:

B-3b(1)(a)   Flood Proofing and Flood Protection Measures: 40 CFR 270.14(b)(11)(iv)(A) and (B)

Provide a structural or other engineering study indicating the various hydrodynamic and hydrostatic forces expected in a 100-year flood and showing how the design of the hazardous waste units and the flood proofing and protection devices at the facility will prevent washout; or

B-3b(1)(b)   Flood Plan: 40 CFR 270.14(b)(11)(iv)(C)

Describe the procedures to be followed to remove hazardous waste to safety before the facility is flooded, including timing related to flood levels, estimated time to move the waste, the location to which the waste will be moved, demonstration that those facilities will be eligible to receive hazardous waste, the planned procedures, equipment, and personnel to be used, and the potential for accidental discharge of the waste during movement.

B-3b(2)       Plan for Future Compliance with Floodplain Standard: 40 CFR 270.14(b)(11)(v)

For facilities located within the 100-year floodplain that do not comply with the floodplain standard, specify how and when the facility will be brought into compliance.

B-3b(3) Waiver for Land Storage and Disposal Facilities: 40 CFR 264.18(b)

To apply for a waiver from the flood proofing and flood plain requirements, demonstrate that procedures are in effect to safely remove the waste before flood waters can reach the facility. Note that the wastes must be moved to a facility that is permitted by IDEM to handle hazardous waste. Demonstrate that washout of land based units will not result in adverse effects to human health or the environment. Take into account the volume and chemical and physical characteristics of the waste; the concentration of hazardous constituents that could potentially effect surface waters and the impact on current or potential uses of and water quality standards established for potentially affected surface waters; and the impact of hazardous constituents on the sediments of potentially affected surface waters and the soils of the 100-year floodplain.

B-4 Traffic Information: 40 CFR 270.14(b)(10)

Provide the following traffic-related information:

- Traffic patterns on-site;
- Estimated volumes, including number and types of vehicles;
- Traffic control signs, signals, and procedures;
- Adequacy of access roadway surfaces and load-bearing capacity for expected traffic on-site.

**C. WASTE CHARACTERISTICS**

C-1 Chemical and Physical Analyses: 40 CFR 270.14(b)(2), 264.13(a), 266.102(a)(2)(ii), 266.102(b)

For each hazardous waste and hazardous debris stored, treated or disposed at the facility, describe the waste, the process generating the waste (in order to determine listed wastes or characterizations based on process knowledge), the hazard characteristics (including EPA Hazardous Waste Number and the classification for the Land Disposal Restriction regulations as wastewater or nonwastewater), and the basis for hazard designation. Provide a laboratory report detailing the chemical and physical analyses of representative samples of the wastestreams. The laboratory report must include the quality assurance/quality control (QA/QC) information necessary to validate the data. Additional guidance for providing analytical results and QA/QC may be found in IDEM's "Analytical Data Deliverable Requirements for RCRA Permits: A Guidance Document." At a minimum, the analyses must include all the information that must be known to treat, store, or dispose of the waste in accordance with Parts 264 and 268 requirements or conditions of a permit issued under Part 270.

C-1a Containerized Waste: 40 CFR 264.172, 270.15(b)(1)

Identify the container construction materials and demonstrate that wastes are compatible with container construction materials.

Indicate that containers of wastes with free liquids will be stored in areas with an adequate secondary containment system. For owners and operators that store containers of wastes without a secondary containment system, provide the test procedures and results, or other documentation or information, which show that the wastes do not contain free liquids. A suggested test for free liquids is the Paint Filter Liquids Test, Method 9095 in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," EPA Publication No. SW-846.

C-1b Waste in Tank Systems: 40 CFR 264.190(a), 264.191(b)(2), 264.192(a)(2)

Provide the hazardous characteristics of the wastes to be handled in the tank systems. Identify the tank construction materials and demonstrate that the tank construction materials are compatible with the wastes stored in the tank.

Indicate that tank systems that store wastes containing free liquids have adequate secondary containment. For owners and operators that maintain waste tanks without a secondary containment system, provide the test procedures and results, or other documentation or information, which show that the wastes do not contain free liquids. To test for free liquids, the Paint Filter Liquids Test, Method 9095 in "Test Methods for Evaluating Solid Wastes Physical/Chemical Methods," EPA Publication No. SW-846 must be used.

C-1c Waste in Piles: 40 CFR 264.250(c)(1) and (4)

For owners and operators requesting a waiver from the waste pile requirements, provide the test procedures and results, or other documentation or information, that show that the wastes do not contain free liquids when placed on the pile and that the wastes will not generate leachate through decomposition or other reactions while being stored. A suggested test for determining the presence of free liquids in wastes placed in piles is the Paint Filter Liquids Test, Method 9095 in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," EPA Publication No. SW-846.

C-1d Landfilled Wastes: 40 CFR 264.13(c)(3), 264.314

Provide the results from the Paint Filter Liquids Test (Method 9095 in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Method," EPA Publication No. SW-846), showing that containerized or bulk wastes do not contain free liquids.

Describe the procedures that will be used to determine if a hazardous waste generator or treater has added biodegradable sorbent to wastes in containers destined to be landfilled. Demonstrate that the sorbent materials used are not capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the Inside containers. Sorbents used to treat free liquids to be disposed of in landfills must be non-biodegradable. Demonstrate that the sorbent material is non-biodegradable either by using a material listed in 40 CFR 264.314(e)(1), or by using ASTM Method G21-70

(1984a) Standard Practice for Determining Resistance of Synthetic Polymer Materials to Fungi; or ASTM Method G22-76 (1984b) Standard Practice for Determining Resistance of Plastics to Bacteria.

C-1e Wastes Incinerated and Wastes Used in Performance Tests: 40 CFR 264.341, 270.62(b)

Analyses must be provided for each waste or waste mixture to be burned during operation and for the waste feed (to be) used in the performance tests, including: heat value; viscosity of liquids; physical form of non-liquids; identification and approximate quantification of Appendix VIII hazardous organic constituents reasonably expected to be present; chlorine concentration; and ash content. If data is submitted in lieu of a trial burn, applicant must quantify potential POHCs and provide a comparison of wastes used in performance tests and those for which permit is sought demonstrating similarity.

C-1f Wastes to be Land Treated: 40 CFR 270.20(b)(4), 264.271(a)(1) and (2), 264.272, 264.276, Part 261 Appendix VIII

For each waste that will be applied to the treatment zone, demonstrate that hazardous constituents in the waste can be completely degraded, transformed, or immobilized in the treatment zone. Provide a list of Part 261 Appendix VIII hazardous constituents reasonably expected to be in or derived from the wastes to be land treated based on waste analyses.

If food chain crops will be grown in or on the treatment zone, identify Part 261 Appendix VIII hazardous constituents reasonably expected to be in or derived from wastes and provide the concentration of cadmium in all wastes to be land treated. [See D-7a (1) and D-7b(1).]

C-1g Waste in Miscellaneous Treatment Units: 40 CFR 270.23(d)

For any miscellaneous unit treating hazardous waste, provide a report or a demonstration of the effectiveness of the treatment based on laboratory or field data.

C-1h Waste in Boilers and Industrial Furnaces: 40 CFR 266.102(b), 270.66(c)

Provide for each waste feed stream, including hazardous waste, other fuels, and industrial furnace feed stocks, as fired: (1) heating value; (2) levels of antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, thallium, total chlorine/chloride, and ash; and (3) viscosity or description of the physical form of the feed stream.

Provide for each hazardous waste, as fired: (1) identification of Appendix VIII constituents that would reasonably be expected in the feed; (2) approximate quantification of the hazardous constituents identified; and (3) if blending is to occur prior to firing. A detailed analysis of the hazardous waste prior to blending, the blending material, blending ratios, and description of blending procedures.

C-2            Waste Analysis Plan: 40 CFR 270.14(b)(3), 264.13(b) and (c), 266.102(a)(2)(ii), 266.104(a)(2), 268.7

Provide a copy of the waste analysis plan that describes the methodologies for conducting the analyses required to properly treat, store, or dispose of hazardous wastes and to comply with the land disposal restriction program. Guidance for developing a Waste Analysis Plan may be found in "Waste Analysis At Facilities That Generate, Treat, Store, And Dispose of Hazardous Wastes," EPA, PB94-963603, April 1994.

C-2a           Parameters and Rationale: 40 CFR 264.13(b)(1)

Provide a list of parameters used to initially characterize each wastestream and provide the rationale for the parameter selection. Indicate the acceptance criteria for each wastestream.

Provide a list of fingerprint parameters used to analyze off-site wastes received at the facility and the rationale for the parameter selection. The fingerprint analyses should indicate that wastes received at the facility are consistent with the wastestream characterization and waste manifests. Provide the fingerprint acceptance criteria for wastes received at the facility.

C-2b           Test Methods: 40 CFR 264.13(b)(2)

Identify and reference (e.g., EPA method number) the test methods used to test for the parameters chosen.

Provide a complete Quality Assurance Project Plan (QAPjP) for the Waste Analysis Plan. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

C-2c           Sampling Methods: 40 CFR 264.13(b)(3), Part 261 Appendix I, Part 266 Appendix IX

Identify and reference (e.g., ASTM/SW-846) the specific sampling methods used to obtain a representative sampling of each waste to be analyzed and document that the chosen method is appropriate for the type and nature of the waste. Indicate the decontamination procedures for sampling equipment.

Indicate the sample preservation procedures, sample containers, and holding times. Describe the chain-of-custody procedures.

C-2d           Frequency of Analyses: 40 CFR 264.13(a)(3), 264.13(b)(4)

Describe the frequency at which the wastestream will be characterized. The wastestreams should be characterized, at a minimum, when the generating processes change, when the wastestreams change, or annually.

C-2e           Additional Requirements for Wastes Generated Off-Site: 40 CFR 264.13(b)(5) and (c), 264.73(b)

Describe the procedures used to inspect and/or analyze a representative portion of wastes generated off-site for fingerprint parameters. Describe the statistical method used to determine a representative sample of the incoming wastes (e.g., discrete samples will be taken from a minimum of ten percent of incoming containers and one from each rail car or tanker). Indicate how the samples will be representative of the wastes.

C-2f      Additional Requirements for Ignitable, Reactive, or Incompatible Wastes: 40 CFR 264.13(b)(6), 264.17

Describe the methods used to meet additional waste analysis requirements necessary for treating, sorting, or disposing of ignitable, reactive or incompatible wastes. Provide the procedures for determining the compatibility of wastes and for separating incompatible wastes.

Waste compatibility guidance may be found in "A Method for Determining the Compatibility of Hazardous Wastes" (EPA/600/2-80-076), 1980, PB80-221-005.

C-2g      Additional Requirements Pertaining to Boiler and Industrial Furnace Facilities: 40 CFR 266.102(e)(6)(ii)(C), 266.102(e)(6)(iii)

Feed rate limits of metals, total chlorine and chloride, and ash are established and monitored by knowing the constituent concentrations (i.e., metals, chlorine/chloride, and ash) in each feed stream and the flow rate of each feed stream. The owner/operator must submit a methodology for determining all feed rates for which limits must be established. At a minimum, the methodology must describe: (1) sampling and analysis methods and frequencies for each constituent, and (2) procedures for determining mass flow rates for individual constituents from the raw analytical data.

C-2h      Additional Requirements Pertaining to Containment Buildings: 40 CFR 264.1100

If the containment building is not designed to manage liquids, demonstrate that wastes do not contain free liquids (e.g., through use of Paint Filter Liquids Test EPA Method 9095 or other appropriate methods).

C-3      Waste Analysis Requirements Pertaining to Land Disposal Restrictions: 40 CFR 262.10, 262.11, 264.13, 264.73, 266.102(a)(2)(ii), Part 268, 270.14(b)(3)

C-3a      Waste Analysis: 40 CFR 261.21 through 261.24, 264.13(a)(1), 268.1, 268.7, 268.9, 268.32 through 268.37, 268.41 through 268.43

For each hazardous waste or each waste treatment residue stored, treated, or disposed at the facility, provide analytical data necessary to determine whether the waste is a restricted waste and whether the waste is being managed properly under the land disposal requirements of 40 CFR Part 268. Wastes must be characterized by their treatability group (i.e., wastewater or nonwastewater) as defined in 268.2(d) and 268.2(f), and if applicable, by their subcategory within a treatability group (e.g., D003 reactive cyanides). Because treatment standards have been established for both listed and characteristic wastes, treatment, storage and/or disposal facilities that land dispose

of restricted wastes are required to determine if the listed wastes also exhibit a hazardous waste characteristic. Process knowledge can be used to determine whether a waste is restricted, but this knowledge must be documented.

For treatment facilities, the waste analysis plan must provide procedures (sampling, analytical, frequency of analysis) for testing wastes or an extract of the waste for compliance with land disposal restrictions.

For land disposal facilities, the owner/operator must provide procedures for testing the waste or treatment residue to demonstrate that land disposed waste complies with applicable prohibitions. The waste analysis plan must present sampling and analytical procedures as well as specify the frequency of analysis.

Wastes that do not meet the treatment standards specified in 40 CFR Part 268 are prohibited from land disposal unless (1) a national capacity variance has been granted, (2) an exemption pursuant to 268.6 has been granted, (3) a case-by-case extension has been granted pursuant to 268.5, or (4) a treatability variance has been granted pursuant to 268.44.

Note: Wastes that were newly identified or newly listed as hazardous after 11/8/84 for which EPA has not promulgated treatment standards are not subject to land disposal provisions.

C-3a(1) Spent Solvent and Dioxin Wastes: 40 CFR 264.13(a)(1), 268.2 (f)(1), 268.7, 268.30, 268.31

Describe procedures that will be used to determine whether F001-F005 spent solvent wastes and F020-F023 and F026-F028 dioxin-containing wastes meet the applicable treatment standards or to determine that the waste has been treated by the appropriate specified treatment technology. Process knowledge can be used to make this determination, as appropriate.

C-3a(2) California List Wastes: 40 CFR 264.13(a)(1), 268.7, 268.32, 268.42(a), RCRA Section 3004(d)

Describe procedures that will be used to determine whether a waste is a California list waste prohibited from land disposal and whether the waste is subject to treatment standards outlined in 268.42(a). Process knowledge can also be used to make this determination.

Although California list restrictions have largely become obsolete as treatment standards have been issued for specific hazardous wastes, California list restrictions still apply in the following instances:

- Liquid hazardous wastes containing PCBs at concentrations greater than or equal to 50 ppm;
- Liquid characteristic wastes containing over 134 mg/l nickel and/or 130 mg/l thallium;



- Characteristic wastes containing Halogenated Organic Compounds (HOCs) at concentrations greater than or equal to 1000 mg/l (liquids) or mg/kg (solids), where the HOCs are not derived from listed hazardous wastes (i.e., F-, K-, P- or U- listed wastes); and
- During any nation-wide extension to the effective date for either a characteristic or listed waste.

Newly listed or newly identified wastes are not subject to the California list prohibitions.

C-3a(3) Listed Wastes: 40 CFR 264.13(a)(1), 268.7, 268.33, 268.34, 268.35, 268.36, 268.41, 268.42, 268.43

Describe procedures that will be used to determine whether a listed waste meets the applicable treatment standards or to demonstrate that the waste has been treated by the appropriate specified treatment technology. Process knowledge can be used to make this determination, as appropriate. Where treatment standards are based on concentrations in the waste extract (see 40 CFR 268.41), generators and treatment, storage and/or disposal facilities must use TCLP to determine if their wastes meet treatment standards. However, arsenic-containing nonwastewaters (K031, K084, K101, K102, P010, P011, P012, P036, P038 and U136) may also use the EP toxicity test to determine compliance with treatment standards.

C-3a(4) Characteristic Wastes: 40 CFR 261.3(d)(1), 264.13 (a)(1), 268.7, 268.9, 268.37, Part 268 Appendix I, Part 268 Appendix IX

Describe procedures that will be used to determine whether a characteristic waste meets the applicable treatment standards or to demonstrate that the waste has been treated by the appropriate specified treatment technology. Process knowledge can be used to make this determination, as appropriate. Where treatment standards are based on concentration in the waste extract (see 268.41), generators must use TCLP to determine if their wastes meet treatment standards. However, characteristic D008 lead nonwastewaters and D004 arsenic nonwastewaters may also use the EP toxicity test to determine compliance with treatment standards.

Describe the procedures that will be used to identify the underlying hazardous constituents that are expected to be present in D001 or D002 wastes, as specified in Part 268.9(a).

Indicate that if, after treatment, a hazardous waste displays a characteristic for the first time, the characteristic waste code will be added to the land disposal notification form and facility records. Describe procedures to make this determination. Indicate wastes will be re-treated, as appropriate, in order to meet characteristic treatment standard prior to land disposal.

C-3a(5) Radioactive Mixed Waste: 40 CFR 268.7, 268.35(c), 268.35(d), 268.36, 268.42(d)

Radioactive mixed wastes are required under both RCRA and the Atomic Energy Act. Prior to land disposal, the hazardous waste constituents of mixed waste must comply

with the appropriate treatment standards listed in 268.41, 268.42, and Table 2 of 268.43. A subset of radioactive mixed wastes listed in Table 3 of 268.42 are subject to the specific treatment standards identified in Table 3. Hazardous debris containing radioactive wastes are not subject to the treatment standards of Table 3 but must comply with the treatment standards specified in 268.45.

Describe procedures that will be used to determine whether a mixed waste meets the applicable treatment standards or to demonstrate that the waste has been treated by an appropriate specified treatment technology. Process knowledge can be used to make this determination, as appropriate.

C-3a(6) Leachates: 40 CFR 260.10, 268.35(a)

Single-source leachate generated from liquids percolating through a single waste (e.g., a monofill), is subject to the land disposal restrictions of the listed waste from which is derived. Single-source leachate cannot be combined to produce multi-source leachates. Multi-source leachates derived solely from dioxin-containing wastes (i.e., F020-F023 and F026-F028) are handled as though they are single-source leachates, and must meet the treatment standards for dioxin-containing waste. Describe procedures that will be used to determine whether a single-source leachate meets the applicable treatment standards or to demonstrate that the waste has been treated by the appropriate specified treatment technology.

Multi-source leachate F039 derives from liquids that percolate through land-disposed listed wastes. Multi-source leachate is subject to the treatment standards of P- and U-wastes from which the leachate may be derived. [Note that it is not necessary to test for every hazardous constituent that may comprise F039 multi-source leachate. EPA guidance requires an initial analysis of all regulated constituents in F039 and, based on the results of the analysis, development of a reduced list of constituents to be monitored on a regular basis. The testing scheme must be supplemented with less-frequent, broader analyses to monitor for any changes in the chemical composition of the leachate.] Describe procedures that will be used to determine whether F039 multi-source leachate meets the applicable treatment standards prior to land disposal.

Leachate that originates from newly identified waste (i.e., those without treatment standards), is not coded as F039 waste but is labelled with the newly listed waste codes from which it is derived.

C-3a(7) Lab Packs: 40 CFR 268.7(a)(7), 268.7(a)(8), 268.42(c), Part 268 Appendix IV, Part 268 Appendix V

Prior to being land disposed, the wastes contained in a lab pack must meet all applicable treatment standards for each waste type. Describe procedures that will be used to determine whether lab pack wastes meet the applicable treatment standards or to demonstrate that the waste has been treated by the appropriate specified treatment technology. Process knowledge can be used to make this determination. Discuss procedures to ensure lab pack wastes will meet land disposal requirements.

Alternatively, a generator can establish two general lab pack categories: (1) organometallic lab packs and (2) organic lab packs. Permissible waste code components of these two lab pack categories are listed in Appendix IV and Appendix V of Part 268. Treatment of organic lab packs requires incineration. Treatment of organometallic lab packs requires incineration followed by treatment of residue to meet D004, D005, D006, D007, D008, D010, and D011 characteristic waste treatment standards. Lab packs containing California list PCBs or dioxins must be treated according to special incineration requirements detailed in 268.42(a). Discuss procedures to ensure that lab pack wastes will meet land disposal requirements.

If lab pack hazardous waste is combined with non lab pack hazardous waste prior to or during treatment, indicate that the entire mixture will be treated to meet the most stringent treatment standard for each waste constituent before being land disposed.

C-3a(8) Contaminated Debris: 40 CFR 268.2(g), 268.7, 268.9, 268.36, 268.45, 270.13(n)

Identify the hazardous debris category or categories (i.e., glass, metal, plastic, rubber, brick, cloth, concrete, paper, pavement, rock, wood) and the contaminant category or categories (i.e., toxicity characteristic, contaminated with listed wastes, cyanide reactive debris) associated with type of hazardous debris.

Identify how hazardous debris will be managed. Prior to land disposal the hazardous debris must be treated according to standards provided in 268.45 (except that debris contaminated with wastes having a specified treatment technology listed in 268.42 must be treated as required in 268.42). Alternatively, the hazardous debris may be treated to meet the existing treatment standards for each waste constituent specified in 268.41, 268.42 and 268.43. Note the hazardous debris that exhibits the characteristics of ignitability, corrosivity, or reactivity must be treated using one of the extraction, destruction, or immobilization technologies identified in Table 1 of 268.45.

C-3a(9) Waste Mixtures and Wastes with Overlapping Requirements: 40 CFR 264.13(a), 268.7, 268.41(b), 268.43(b), 268.45(a)

Describe the procedures that will be used to demonstrate that waste mixtures and wastes carrying multiple waste codes are properly characterized and meet treatment standards prior to land disposal. Wastes that carry more than one characteristic or listed waste code must be treated to the most stringent treatment requirement for each hazardous waste constituent of concern prior to land disposal.

When wastes with differing treatment standards are combined solely for purposes of treatment, indicate that the most stringent treatment standard specified will be met for each constituent of concern in the combined waste prior to land disposal.

C-3a(10) Dilution and Aggregation of Wastes: 40 CFR 268.3

Facilities that perform dilution or aggregation of hazardous wastes must demonstrate that these activities are not in violation of land disposal regulations. Listed wastes, if destined for land disposal, may never be diluted. Characteristic wastes that are not toxic

(i.e., D001 through D003) may be diluted. Characteristic wastes that are toxic (i.e., D004 through D043) may be diluted only if: (1) the waste is to be underground injected and the characteristic is to be removed prior to injection, (2) the waste has a concentration-based and not a technology-based treatment standard, is not a D003 reactive waste, and is being treated in a system pursuant to the Clean Water Act, or (3) the waste is not destined for land disposal.

A facility cannot dilute or partially treat a listed waste to switch treatability categories (e.g. switch from non-wastewater to wastewater), in order to comply with different treatment standards. Note that IDEM does not consider dewatering technologies (i.e., filtration, centrifugation, etc.) that produce a wastewater fraction and a nonwastewater fraction to be impermissible category switching.

Aggregation of wastes for treatment is not considered impermissible dilution, if wastes are all legitimately amenable to the same type of treatment to be performed.

C-3b                    Notification, Certification, and Recordkeeping Requirements: 40 CFR 264.73, 268.7, 268.9(d)

The waste analysis plan must present procedures for preparing and/or maintaining applicable notifications and certifications to comply with land disposal restrictions. A treatment facility that generates treatment residues must prepare applicable notifications and certifications. Any facility receiving wastes from off-site must provide procedures in the waste analysis plan for ensuring proper certifications are submitted prior to accepting land disposal restricted wastes.

C-3b(1)                Retention of Generator Notices and Certifications: 40 CFR 268.7(a)

The owner/operator of a treatment, storage or disposal facility managing any waste subject to land disposal restrictions must demonstrate that the following notices and certifications submitted by the initial generator of the waste will be re-reviewed and maintained:

- Notices of restricted wastes not meeting treatment standards or exceeding California-list prohibition levels or RCRA Section 3004(d), including the information listed in 268.7(a)(1).
- Notices of restricted wastes meeting applicable treatment standards and prohibition levels, including the information in 268.7(a)(2).
- Notices of waste receiving a case-by-case extension under 268.5, and exemption under 268.6, or a nationwide variance, including the information in 268.7(a)(3).

C-3b(2)                Notification and Certification Requirements for Treatment Facilities: 40 CFR 268.7(b)

The treatment facility must submit a notice and certification to the land disposal facility with each shipment of restricted waste or treatment residue of a restricted waste. The notice must include the information listed in 268.7(b)(4) and 268.7(b)(5).

If the waste or treatment residue will be further managed at a different treatment or storage facility, the facility sending the waste or treatment residue off-site must comply with the notice and certification requirements applicable to generators, as specific in 268.7(a).

C-3b(3) Notification and Certification Requirements for Land Disposal Facilities: 40 CFR 268.7(c)(1)

The owner/operator of a land disposal facility disposing of waste subject to land disposal restrictions must maintain copies of the notice and certifications submitted by the generator and the treatment/storage facilities, if applicable.

C-3b(4) Wastes Shipped to Subtitle C Facilities: 40 CFR 268.7(a), 268.7(b)(6)

For restricted wastes or waste treatment residues that will be further managed at a Subtitle C (hazardous waste management) facility, the owner/operator of the facility shipping the waste off-site must submit notifications and certifications in compliance with the notice and certification requirements applicable to generators under 268.7(a). Each shipment of waste that is to be transported off-site to a RCRA permitted Subtitle C treatment, storage, and/or disposal facility, must include a written notification and certification that the waste either meets or does not meet applicable treatment standards or prohibition levels.

C-3b(5) Wastes Shipped to Subtitle D Facilities: 40 CFR 268.7(d), 268.9(d)

A one-time notification and certification is required for characteristic wastes (or listed wastes that are listed only because they exhibit a characteristic) that have been treated to remove the hazardous characteristic and are no longer considered hazardous. The owner/operator must place a certification (and all treatment records) in the facility's files and send a notification and certification to the EPA Regional Administrator (or delegated representative) describing the wastes and applicable treatment standards and identifying the Subtitle D (solid waste management) disposal facility receiving the waste. On an annual basis, the notification and certification must be updated and refiled if the process or operation generating the waste and/or if the Subtitle D facility receiving the waste changes.

A one-time notification and certification is required for hazardous debris that has been treated by an extraction or destruction technology provided by Table 1 of 268.45 or debris that the Director has determined does not contain hazardous waste. The notification and certification must be placed in the facility's operating record and must be sent to the Director or authorized state identifying the Subtitle D facility receiving the waste, a description of the hazardous debris as initially generated including EPA waste ID numbers; and the technology used to treat the debris. This notice must be updated whenever the facility accepting the debris, the type of debris, or the type of treatment technology changes.

C-3b(6) Recyclable Materials: 40 CFR 268.7(b)(6)

For waste that are recyclable materials used in a manner constituting disposal, in accordance with 266.20(b), the owner/operator of a storage or treatment facility must submit a notice and certification to the IDEM Commissioner with each shipment of waste describing the waste and applicable treatment standards and identifying the facility receiving the waste product.

C-3b(7) Recordkeeping: 40 CFR 264.73, 268.7(a)(5), 268.7(a)(6), 268.7(a)(7), 268.7(d)

Treatment, storage, and/or disposal facilities that manage wastes generated on-site (1) determine if the waste is restricted from land disposal and keep documentation of that determination, and (2) maintain documentation to indicate where restricted wastes were treated, stored, and/or disposed.

Facilities managing wastes generated on-site that use only process knowledge to determine compliance with land disposal restrictions, must retain all data used to make this determination. If the owner/operator tests a representative sample of the waste to determine compliance with land disposal restrictions, all waste analysis data must be retained on-site in the facility's files.

The owner/operator of a treatment, storage and/or disposal facility managing any waste subject to land disposal restrictions must demonstrate that all notifications and certifications submitted by waste generators or other treatment, storage and/or disposal facilities will be reviewed and will be maintained as part of the operating record until closure of the facility, in accordance with recordkeeping requirements of 264.73.

Land disposal facilities are required to keep records of the quantities and date of placement of each shipment of waste placed in a land disposal unit under an extension to the effective date of any land disposal restriction pursuant to 268.5, or a no-migration petition pursuant to 268.6.

Recycling facilities must keep records of the name and location of each entity receiving a hazardous waste derived product.

Facilities managing a restricted waste that is excluded from the definition of a hazardous or solid waste or exempt from Subtitle C regulations, must place a one-time notice in the facility files describing the generation, basis for exclusion or exemption, and disposition of the waste. (Exclusions and exemptions are detailed in 329 IAC 3.1-6-2, 40 CFR 261.2 through 261.6.) For each shipment of treated debris, the owner/operator must place a certification of compliance with applicable treatment standards in the facility's files.

C-3c Requirements Pertaining to the Storage of Restricted Wastes: 40 CFR 268.50

The owner/operator of a treatment, storage and/or disposal facility storing hazardous wastes that are restricted from land disposal must demonstrate that (1) they are storing such wastes in tanks, containers, or containment buildings on-site and (2) such storage is solely for the purpose of accumulating sufficient quantities of waste to facilitate proper treatment, recovery, or disposal.

If prohibited wastes are stored beyond one year, the owner/operator has the burden of proving, in the event of an enforcement action, that storage is for allowable reasons. Prior to one year, IDEM maintains the burden of proving that storage has occurred for the wrong reason.

Storage requirements do not apply to restricted wastes that:

- Meet the applicable treatment standards; or
- Have received a nationwide variance; or
- Have received an exemption under 268.6; or
- Have received a case-by-case extension under 268.5

C-3c(1) Restricted Wastes Stored in Containers: 40 CFR 268.50(a)(2)(i)

If wastes are stored in containers, the owner/operator must demonstrate that each container will be clearly marked to identify its contents and the date each period of accumulation begins.

C-3c(2) Restricted Wastes Stored in Tanks: 40 CFR 268.50(a)(2)(ii)

If wastes are stored in tanks, the owner/operator must demonstrate that each tank will be clearly marked with a description of its contents, the quantity of each hazardous waste received, and the date each period of accumulation begins. Alternatively, the owner/operator may demonstrate that such information will be recorded and maintained in the operating record at the facility for each restricted waste storage tank.

C-3c(3) Storage of Liquid PCB Wastes: 40 CFR 268.50(f)

If liquid hazardous wastes containing concentrations of PCBs greater than or equal to 50 ppm will be stored at the facility, the owner/operator must demonstrate that the facility meets the requirements of 40 CFR 761.65(b). The owner/operator must describe procedures for removal of these wastes from storage within one year and treatment or disposal of the wastes in compliance with land disposal restrictions.

C-3d Exemptions, Extensions, and Variances to Land Disposal Restrictions

C-3d(1) Case-by-Case Extensions to an Effective Date: 40 CFR 268.5, 270.14(b)(21)

The owner/operator of a treatment, storage and/or disposal facility requesting an extension to the effective date of any restriction in Subpart C of Part 268 must submit an application to the Regional Administrator containing the information and certification described in 268.5(a) and 268.5(b). If a case-by-case extension has been approved under 268.5, the owner/operator must submit a copy of the notice of approval.

C-3d(2) Exemption from Prohibition: 40 CFR 268.6, 270.14(b)(21)

The owner/operator of a treatment, storage and/or disposal facility requesting an exemption from a prohibition for the disposal of a restricted waste in a particular unit

or units must submit a petition to the Regional Administrator demonstrating that there will be no migration of hazardous constituents from the disposal unit(s) or injection zone for as long as the wastes remain hazardous. The petition must include the demonstration and certification specified in 268.6(a) through 268.6(d). If a petition has been approved under 268.6, the owner/operator must provide a copy of the notice of approval.

C-3d(3) Variance from a Treatment Standard: 40 CFR 268.44

A treatment facility may petition the Regional Administrator for a site-specific variance from a specific treatment standard if a waste cannot be treated to the specified level or if the treatment technology is not appropriate to the waste. The applicant must demonstrate that, because the physical or chemical properties of the waste differ significantly from wastes analyzed in developing the treatment standard, the waste cannot be treated to specified levels or by the specified methods. The variance petition must establish alternative treatment standard(s).

C-3d(4) Requirements for Surface Impoundments Exempted from Land Disposal Restrictions: 40 CFR 268.4, 264.13(b)(7), 268.14

Surface impoundments that are exempted from land disposal restrictions under 268.4(a) or 268.14, must comply with the following:

C-3d(4)(a) Exemption for Newly Identified or Listed Wastes: 40 CFR 268.14

After 48 months following the promulgation of a new hazardous waste listing or characteristic, an owner/operator may not place or treat hazardous wastes in a surface impoundment that is newly subject to Subtitle C of RCRA as a result of the new waste identification. Additionally, the owner/operator of the newly regulated surface impoundment must comply with interim status standards (Part 265 Subpart F) within 12 months after promulgation of the new waste listing or characteristic.

If the owner/operator continued to treat newly listed or characteristic hazardous wastes after 48 months from the promulgation of the new waste listing or characteristic, the surface impoundment must be in compliance with 268.4 as detailed below:

C-3d(4)(b) Treatment of Wastes: 40 CFR 268.4(a)(1), 268.4(b)

The owner/operator must demonstrate that treatment of wastes otherwise prohibited from land disposal occurs in the surface impoundment. Note that evaporation of hazardous constituents as a principal means of treatment is not considered a valid treatment method for an exemption from land disposal restrictions.

C-3d(4)(c) Sampling and Testing: 40 CFR 268.4(a)(2)(i), 268.4(a)(2)(iv), 264.13(b)(6)

The surface impoundment facility waste analysis plan must include the procedures and schedule for sampling and analysis of treatment residues and the analysis of test data to determine if the residues meet the applicable treatment standards or prohibitions.



C-3d(4)(d) Annual Removal of Residues: 40 CFR 268.4(a)(2)(ii), 264.13(b)(7)(iii)

The owner/operator must provide procedures and schedules for annual removal from the surface impoundment of treatment residues (including any liquid waste) that:

- Do not meet treatment standards or prohibition levels; or
- Are residues of wastes prohibited from land disposal where no treatment standards or prohibitions apply; or
- Are residues from listed wastes that are not delisted under 260.22; or
- Exhibit a characteristic of hazardous waste.

Treatment residues that are the subject of a valid certification under 268.8 made no later than a year after placement of the wastes in the impoundment are not required to be removed annually.

C-3d(4)(e) Design Requirements: 40 CFR 268.4(a)(3), 268.4(a)(4)

The owner/operator of the surface impoundment facility must demonstrate that the design requirements of 264.221(c) (minimum two liners with a leachate collection and removal system between the liners) have been met or that an exemption, waiver, or modification has been granted under 268.4(a)(3).

## **D. PROCESS INFORMATION**

D-1 Containers: 40 CFR 270.15, 264.170 through 264.178

D-1a Containers with Free Liquids

D-1a(1) Description of Containers: 40 CFR 264.171, 264.172, 270.14(b)(2)

Provide the following information about the containers used to treat/store hazardous waste: approximate number of each type of container, construction materials, dimensions and usable volumes, DOT specifications or other manufacturer specifications, liner specifications (if applicable), container condition (new, used, reconditioned), and markings and labels.

D-1a(2) Container Management Practices: 40 CFR 264.173

Describe the container management practices used to ensure that hazardous waste containers are always kept closed during storage, except when adding or removing waste, and are not opened, handled, or stored in a manner that may cause them to rupture or to leak. Include a discussion of procedures for transporting containers across the facility.

Indicate the aisle space maintained between rows of containers and provide the maximum number, volume, and stacking height of containers for each area in which containers are stored.

D-1a(3) Secondary Containment System Design and Operation: 40 CFR 270.15(a)(1), 264.175(a), 264.175(d)

Provide design and profile drawings of the existing or planned container storage area(s), showing the secondary containment system. Indicate on the drawings the areas in which incompatible wastes will be stored. Note that the secondary containment system requirements also apply to storage areas holding wastes F020, F021, F022, F023, F026, and F027, whether or not the wastes contain free liquids.

D-1a(3)(a) Requirement for the Base or Liner to Contain Liquids: 40 CFR 264.175(b)(1)

Demonstrate the capability of the base to contain liquids, including:

- Statement that base is free of cracks or gaps;
- Demonstration of imperviousness of base to wastes and precipitation;
- Base design and materials of construction;
- Engineering evaluation of structural integrity of base; and
- Documentation of compatibility of base with wastes.

D-1a(3)(b) Containment System Drainage: 40 CFR 270.15(a)(2), 264.175(b)(2)

The base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids.

D-1a(3)(c) Containment System Capacity: 40 CFR 270.15(a)(3), 264.175(b)(3)

Provide calculations that demonstrate that the containment system will have sufficient capacity to contain 10% of the volume of the containers or the volume of the largest container, whichever is greater. This demonstration must discuss the volume of largest container, total volume of containers, containment structure capacity, and volume displaced by containers and other structures in the containment system.

D-1a(3)(d) Control of Run-on: 40 CFR 270.15(a)(4), 264.175(b)(4)

Run-on into the containment system must be prevented, unless the collection system has sufficient excess capacity in addition to that required in the above paragraph to contain any run-on that might enter the system. Describe the dikes, berms, drainage system, etc., used to prevent run-on, or provide calculations demonstrating that the containment system has sufficient excess capacity to contain run-on. (A 24-hour, 25-year storm event can be used as the basis for the calculations).

D-1a(3)(e) Removal of Liquids from Containment System: 40 CFR 270.15(a)(5), 264.175(b)(5)

Spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in a timely manner to prevent overflow of the containment system. Describe the procedures and equipment used during liquids removal. Provide sump,

pump, and piping drawings, if applicable. Specify the methods for determining whether the removed material is a hazardous waste and for handling it as such.

D-1b            Containers Without Free Liquids

D-1b(1)        Test for Free Liquids: 40 CFR 270.15(b)(1)

Submit the test procedures and results or other documentation or information to show that the wastes to be stored in the containers storage area do not contain free liquids.

D-1b(2)        Description of Containers: 40 CFR 264.171, 264.172

Provide the following information about the containers used to treat/store hazardous waste: approximate number of each type of container, construction materials, dimensions and usable volumes, DOT specifications or other manufacturer specifications, liner specifications (if applicable), container condition (new, used, reconditioned), and marking and labels.

D-1b(3)        Container Management Practices: 40 CFR 264.173

Describe the container management practices used to ensure that hazardous waste containers are always kept closed during storage, except when adding or removing waste, and are not opened, handled, or stored in a manner that may cause them to rupture or to leak. Include a discussion of procedures for transporting containers across the facility. Indicate the aisle space maintained between rows of containers and provide the maximum number, volume, and stacking height of containers for each area in which containers are stored.

D-1b(4)        Container Storage Area Drainage: 40 CFR 270.15(b)(2), 264.175(c)

Describe how the storage area is designed or operated to drain and remove liquids unless containers are otherwise kept from contact with standing liquids.

D-2            Tank Systems: 40 CFR 270.16; 264.191 through 264.194

D-2a            Tank Systems Description: 40 CFR 270.14(b)(1), 264.194(a)

Provide a description of the type (i.e. aboveground, underground), material of construction, volume, and number of tanks, as well as the specific location of each tank.

D-2a(1)        Dimensions and Capacity of Each Tank: 40 CFR 270.16(b)

Provide the dimensions and capacity of each tank.

D-2a(2)        Description of Feed Systems, Safety Cut-off, Bypass Systems and Pressure Controls:  
40 CFR 270.16(c), 264.194(b)

Provide a description of the feed systems, spill prevention controls, safety cut-off, bypass systems, and pressure controls (e.g., vents).

D-2a(3) Diagram of Piping, Instrumentation and Process Flow: 40 CFR 270.16(d)

Provide a diagram of piping, instrumentation and process flow for each tank system.

D-2a(4) Ignitable, Reactive, and Incompatible Wastes: 40 CFR 270.16(j), 264.17(b), 264.198, 264.199

Indicate whether ignitable, reactive or incompatible wastes are to be managed in the tanks. Indicate the operating pressure and temperature of tanks.

If ignitable or reactive wastes are to be managed in tanks:

- Demonstrate that waste is treated, rendered or mixed before or immediately after placement in the tank systems so that it no longer is ignitable or reactive and that 264.17(b) is complied with (see checklist item F-5b);
- Demonstrate that the waste is stored or treated in a manner such that it protects against ignition or reaction; or
- Demonstrate that the tank system is used solely for emergencies.

If incompatible wastes are managed in tanks, demonstrate that they are not placed in the same tank system unless 264.17(b) is complied with (see checklist item F-5b). Provide procedures assuring that hazardous waste will not be placed in a tank that previously held an incompatible waste or material unless it has been decontaminated or unless precautions have been taken per 264.17(b) to prevent reactions.

Note: See checklist item F-5e

D-2b Existing Tank System

D-2b(1) Assessment of Existing Tank System's Integrity: 40 CFR 264.191, 270.16(a)

Provide a written assessment, that is reviewed and certified by an independent, qualified, registered professional engineer, on the structural integrity and suitability of each tank system for handling hazardous waste. At a minimum, this assessment must consider the following: (1) design standard(s), if available according to which the tank and ancillary equipment were constructed; (2) hazardous characteristics of the wastes that have been and will be handled; (3) existing corrosion protection measures (i.e., for underground tanks); (4) documented age of the tank system, if available (otherwise, an estimate of the age); and (5) results of a leak test, internal inspection, or other tank integrity examination.

D-2c New Tank Systems

D-2c(1) Assessment of New Tank System's Integrity: 40 CFR 264.192(a), 270.16(a) and (e)

Provide a written assessment, that is reviewed and certified by an independent, qualified, registered professional engineer, on the structural integrity and suitability of each tank system for handling hazardous waste. The assessment must show that the foundation, structural support, seams, connections and pressure controls (if applicable) are adequately designed and that the tank system has sufficient structural strength and compatibility with the waste(s) to be stored or treated and corrosion protection to ensure that it will not collapse, rupture, or fail. At a minimum, this assessment must include the following (1) design standard(s) according to which tank(s) and/or the ancillary equipment are constructed; (2) hazardous characteristics of the waste(s) to be handled; (3) a corrosion assessment by a corrosion expert for new tank systems or components in which the external shell of a metal tank or any external metal component of the tank system will be in contact with the soil or with water; (4) a determination of design or operation measures that will protect underground tank systems against potential damage due to vehicular traffic; (5) design considerations to ensure that tank foundations will maintain the load of a full tank and that tank systems will be anchored to prevent flotation or dislodgement where the tank system is placed in a saturated zone or is located within a seismic fault zone; and (6) design considerations to ensure that tank systems will withstand the effects of frost heave. Provide a description of materials and equipment used to provide external corrosion protection.

D-2c(2)      Description of Tank System Installation and Testing Plans and Procedures: 40 CFR 264.192(b)(e), 270.16(f)

Demonstrate that an independent, qualified installation inspector or an independent, qualified registered professional engineer will inspect each new tank system prior to covering, enclosing, or placing a new tank system or component in use. This inspection is to determine the presence of weld breaks, punctures, scrapes of protective coatings, cracks, corrosion and other structural damage or inadequate construction/installation. Specify how all discrepancies will be repaired.

Demonstrate that new tank systems or components that are placed underground and that are backfilled must be provided with a backfill material that is a noncorrosive, porous, homogeneous substance and that is installed so that the backfill is placed completely around the tank and compacted to ensure that the tank and piping are fully and uniformly supported.

Demonstrate that all new tanks and ancillary equipment will be tested for tightness prior to being covered, enclosed, or placed in use. Specify how repairs will be made if the tank system is found not to be tight.

Demonstrate how ancillary equipment will be supported and protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.

D-2d      Containment and Detection of Releases: 40 CFR 264.193

D-2d(1)      Plans and Description of the Design, Construction, and Operation of the Secondary Containment System: 40 CFR 264.193(b) through (f), 270.16(g)

D-2d(1)(a) Tank Age Determination: 40 CFR 264.193(a); 270.16(g)

Specify the age of all existing tank systems so that IDEM can determine when requirements for secondary containment and leak detection will take effect. If the age of a tank system cannot be determined, indicate the reason.

D-2d(1)(b) Requirements for Secondary Containment and Leak Detection: 40 CFR 264.193(b)(c), 264.1101(b)(3)(iii), 270.16(g)

Demonstrate that the secondary containment system has been (will be) designed, installed and operated to prevent any migration of waste or accumulated liquid from the tank system to the soil, groundwater, or surface water at any time during its use. Also, demonstrate that the secondary containment system can detect and collect releases and accumulated liquids. This demonstration must include at least the following:

- Specify the materials of construction used to construct or line the system. Show that these materials are compatible with the wastes in the tank system.
- Demonstrate that the system has sufficient strength and thickness to prevent failure cause by any of the following:
  - pressure gradients (including static head and external hydrological forces),
  - physical contact with the wastes,
  - climatic conditions,
  - stress of daily operation (including stresses from nearby vehicular traffic).
- Present calculations to prove that the secondary containment system is placed on a foundation or base that is capable of providing support, resisting pressure gradients above and below the system, and preventing failure due to settlement, compression, or uplift.
- Provide a description of the leak detection system, including its operating principle, design features and operating procedures. Demonstrate that the leak detection system will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours. If the prevailing site conditions or detection technologies will not allow detection of a release within 24 hours, then specify the earliest practicable time that detection can take place. Indicate why this longer period does not pose a threat to human health and the environment.
- Show how the secondary containment system is sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation.
- Document how it will be ensured that spilled or leaked wastes and precipitation will be removed for the secondary containment system within 24 hours. If wastes and precipitation cannot be removed within 24 hours, then specify the earliest practicable time that the removal can take place. Indicate why this longer period does not pose a threat to human health and environment.

D-2d(1)(c) Requirements for External Liner, Vault, Double-Walled Tank or Equivalent Device: 40 CFR 264.193(d)-(e), 270.16(g)

Show that secondary containment for each tank includes at least one of the following: a liner external to the tank, a vault, a double-walled tank, or an equivalent device approved by IDEM.

For each external liner system, provide the following information:

- Present calculations to show that the external liner system is designed or operated to contain 100% of the capacity of the largest tank within its boundary.
- Show that the external liner system is designed or operated to prevent run-on or infiltration of precipitation. Alternatively, show that the collection system has sufficient excess capacity to contain run-on and precipitation from a 25-year, 24-hour rainfall.
- Show that the external liner system is free of cracks or gaps.
- Demonstrate that the system is designed and installed to surround the tank completely and to cover all surrounding soil likely to come in contact with the wastes if they were released from the tank(s).

For each vault system, provide the following information:

- Present calculations to show that the vault system is designed or operated to contain 100% of the capacity of the largest tank within its boundary.
- Show that the vault system is designed or operated to prevent run-on or infiltration of precipitation. Alternatively, show that the collection system has sufficient excess capacity to contain run-on and precipitation. Alternatively, show that the collection system has sufficient excess capacity to contain run-on and precipitation from a 25-year, 24-hour rainfall.
- Demonstrate that the vault system is constructed using chemical-resistant water stops in place at any joints. Specify the material used.
- Demonstrate that the vault is provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the vault material. Specify coating or lining used, and provide the manufacturer's data sheet.
- Specify the method used to protect against the formation and ignition of vapors within the vault, if the waste being stored or treated is ignitable or reactive.
- Specify the exterior moisture barrier used, and provide the manufacturer's data sheet. Alternatively, describe how the vault is designed or operated to prevent the migration of moisture into the vault if the vault is subject to hydraulic pressure.

For each double-walled tank, provide the following information:

- Demonstrate that the unit is designed as an integral structure so that any release from the inner tank is contained by the outer shell.

- If the unit is metallic, specify the type(s) of corrosion protection used both the internal and external shell. Corrosion protection is required for tanks in contact with soil and/or water.
- Describe the leak detection system used including the principle of operation, design, and operating characteristics. Demonstrate that it is a continuously operating unit, capable of detecting a release within 24 hours. If the prevailing site conditions or detection technologies will not allow detection of a release within 24 hours, then specify the earliest practical time that detection can take place. Indicate why this longer period does not pose a threat to human health and environment.

D-2d(1)(d) Secondary Containment and Leak Detection Requirements for Ancillary Equipment:  
40 CFR 264.193(f), 270.16(g)

Demonstrate that each tank system's ancillary equipment is provided with secondary containment such as jacketing, double-walled piping, or a trench. Note that demonstration need not be made for: (1) aboveground piping (exclusive of flanges, joints, valves, and other connections) that are visually inspected daily, (2) welded flanges, joints, and connections that are visually inspected daily, (3) seal-less or magnetic coupling pumps that are visually inspected daily, and (4) pressurized above-ground piping systems with automatic shut-off devices that are visually inspected daily.

Describe the containment system, and demonstrate that it has been (will be) designed, installed and operated to prevent any migration of waste or accumulated liquid to the soil, groundwater, or surface water at any time during its use. Also, demonstrate that the containment system can detect and collect releases and accumulated liquids. This demonstration must include at least the following:

- Specify the materials of construction used to construct or line the system. Show that these materials are compatible with the wastes in the tank system.
- Demonstrate that the system has sufficient strength and thickness to prevent failure caused by any of the following:
  - pressure gradients (including static head external hydrological forces);
  - physical contact with the wastes;
  - climatic conditions; and/or
  - stress of daily operation (including stresses from nearby vehicular traffic).
- Present calculations to prove that the secondary containment system is placed on a foundation or base that is capable of providing support, resisting pressure gradients above and below the system, and preventing failure due to settlement, compression, or uplift.
- Provide a description of the leak detection system, including its operating principle, design features and operating procedures. Demonstrate that the leak detection system will detect the failure of either the primary or secondary containment structure or the presence of any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours. If the prevailing site conditions or detection technologies will not allow detection of a release within 24 hours, then specify the earliest practical time that detection can



take place. Indicate why this longer period does not pose a threat to human health and the environment.

- Show how the secondary containment system is sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation.
- Document how it will be ensured that spilled or leaked wastes and precipitation will be removed from secondary containment system within 24 hours. If wastes and precipitation cannot be removed within 24 hours, then specify the earliest practicable time that removal can take place. Indicate why this longer period does not pose a threat to human health and the environment.

D-2d(1)(e) Containment Buildings Used as Secondary Containment for Tank Systems: 40 CFR 264.1101(b)(3)(iii)

If a containment building serves as secondary containment for a tank system, demonstrate that the containment building can serve as an acceptable external liner system for a tank, provided it meets the requirements of 264.193(b), 264.193(c)(1), 264.193(c)(2), and 264.193(d)(1). [See checklist Sections D-2d(1)(b) and D-2d(1)(c) above for compliance with these regulations.]

D-2d(2) Requirements for Tank Systems Until Secondary Containment is Implemented: 40 CFR 264.193(i)

For non-enterable underground tanks, present the results of a leak test (or other tank integrity test approved by the Regional Administrator). Indicate the procedures that will be repeated annually until secondary containment is provided. For other than non-enterable underground tanks, provide the results of a leak test or present a schedule and procedures for assessing the overall condition of the tank system by an independent, qualified registered professional engineer until secondary containment is provided. For ancillary equipment, present the results of a leak test (or other integrity assessment measures approved by the Regional Administrator). Indicate the procedures that will be used to ensure that such tests will be repeated annually until secondary containment is provided.

D-2d(3) Variance from Secondary Containment Requirements: 40 CFR 264.193(g), 279.16(h)

D-2d(3)(a) Variance Based on a Demonstration of Equivalent Protection of Groundwater and Surface Water: 40 CFR 264.193(g)(1), 264.193(h), 270.16(h)(1)

Provide detailed plans and engineering and hydrogeologic reports, as appropriate, describing alternate design and operating practices that will, in conjunction with location aspects, prevent the migration of any hazardous waste or hazardous constituents into the groundwater or surface water during the life of the facility.

D-2d(3)(b) Variance Based on a Demonstration of No Substantial Present or Potential Hazard: 40 CFR 264.193(g)(2), 264.193(h), 270.16(h)(2)

Provide a detailed assessment of the substantial present or potential hazards posed to human health or the environment, should a release enter the environment.

D-2d(3)(c) Exemption Based on No Free Liquids and Location Inside a Building: 40 CFR 264.190(a)

Demonstrate that tanks used to store or treat hazardous waste contain no free liquid as defined by the Paint Filter Test (EPA Method 9095 as described in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," EPA Publication No. SW-846). Show that such tanks are situated inside a building with an impermeable floor.

D-2e Controls and Practices to Prevent Spills and Overflows: 40 CFR 264.194(a) and (b), 264.195, 270.16(i)

Provide adequate information to ensure that the hazardous wastes or treatment reagents placed in a tank system will not cause any element of the system to rupture, leak, corrode, or otherwise fail.

Provide a detailed description of controls and practices used to prevent spills and overflows. At a minimum, this must include: (1) spill prevention controls (e.g., check valves, dry disconnect couplings); (2) overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank); and (3) maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

Provide detailed plans for the schedule and procedure for inspecting the following: (1) overfill controls; (2) aboveground portions of the tank system; (3) data from monitoring and leak detection equipment; (4) construction materials and the area immediately surrounding the externally accessible portion of the entire tank system; and (5) the cathodic protection system (for underground tanks).

Note: See checklist item F-2b(2).

D-3 Waste Piles: 40 CFR 270.18, 264.250 through 264.259

D-3a List of Wastes: 40 CFR 270.18(a)

Provide a list of all hazardous wastes placed or to be placed in waste piles.

D-3b Liner Exemption

D-3b(1) Enclosed Dry Piles: 40 CFR 270.18(b), 264.250(c)

If an exemption is requested from the requirements to install a liner and leachate collection system and the Subpart F groundwater monitoring requirements, demonstrate that neither run-off nor leachate is generated from the pile.

D-3b(1)(a) Protection From Precipitation: 40 CFR 270.18(b), 264.250(c)

Demonstrate that the pile is inside or under a structure that provides complete protection from precipitation.

D-3b(1)(b) Free Liquids: 40 CFR 270.18(b), 264.250(c)(1)

Demonstrate that neither liquids nor materials containing free liquids are placed in the pile.

D-3b(1)(c) Run-on Protection: 40 CFR 270.18(b), 264.250(c)(2)

Demonstrate that the pile is protected from surface water run-on by the structure or in some other manner.

D-3b(1)(d) Wind Dispersal Control: 40 CFR 270.18(b), 264.250(c)(3)

Demonstrate how the pile design and operation controls wind dispersal of wastes.

D-3b(1)(e) Leachate Generation: 40 CFR 270.18(b), 264.250(c)(4)

Demonstrate that the pile will not generate leachate through decomposition or other reactions.

D-3b(2) Exemption for Monofills: 40 CFR 270.18(b), 264.251(e)(1)

Demonstrate that the waste pile will consist of a monofill receiving only wastes from foundry furnace emission controls or metal casting molding sand that are not hazardous wastes for reasons other than toxicity characteristics. In addition, demonstrate either of the following:

- The design and operating practices that will, in conjunction with local aspects, prevent the migration of hazardous constituents into ground or surface waters at any future time; or
- The site is located at least one-quarter mile from a source of drinking water, has at least one non-leaking liner, and meets the requirements of 40 CFR 264, Subpart F.

D-3b(3) Alternate Design/No Migration: 40 CFR 270.18(c)(1), 264.251(b)

If an exemption is requested from only the liner requirement, document the design and operating practices that will, in conjunction with local aspects, prevent the migration of hazardous constituents into ground or surface waters at any future time.

D-3b(4) Exemption Based on Alternative Design and Location: 40 CFR 270.18(c)(1), 264.251(d)

If an exemption from the double liner and leachate collection and removal system is required based on an alternative design, document that the alternative design and operating practices, together with location characteristics, will prevent this migration of

any hazardous constituent into the ground or surface water at least as effectively as a double liner with leachate detection system, and will allow detection of hazardous constituents through the top liner as least as effectively.

D-3b(5) Exemption for Replacement Waste Piles: 40 CFR 264.251(f)

If the owner/operator of a replacement waste pile seeks an exemption from the required liner system (top liner, leachate collection and removal system, composite lower liner, and leachate detection system), demonstrate (1) that the existing unit was constructed in compliance with the design standards of Sections 3004(o)(1)(A)(i) and 3004(o)(5) of RCRA; and (2) there is no reason to believe that the liner is not functioning as designed.

D-3c Liner System: 40 CFR 270.18(c)(1), 264.251(a)(1)(i), 264.251(c)

Provide a description of the liner system, demonstrating that the flow of liquids through the liners will be prevented. Only existing portions of existing facilities are exempt from the liner requirements. New units, lateral expansion of existing units, and replacement units are not exempt. Provide a plan indicating the limits of the existing portions.

D-3c(1) Liner Description: 40 CFR 270.18(c)(1), 264.251(a)(1)(i), 264.251(c)

Provide a detailed description of the liner system, demonstrating (by description and drawings) that any flow of liquids into and through the liners will be prevented. For each liner within the system (minimum one upper synthetic liner and one lower composite synthetic/soil liner) describe the type of liner, its material, and its thickness. The liner system includes the foundation, bottom composite liner, leachate detection system, top synthetic liner, leachate collection system and protective layer to protect the leachate collection system from damage.

D-3c(1)(a) Synthetic Liners: 40 CFR 270.18(c)(1), 264.251(a)(1), 264.251(c)(1)

The liner system must include a top liner designed and constructed of materials (e.g. a geomembrane) to prevent the migration of hazardous constituents into such liner during the active life and post-closure care period. The bottom liner must consist of at least two components; the upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent the emigration of hazardous constituents into such liner during the active life and post-closure period. For each synthetic liner in the system provide the following information:

- Thickness,
- Type,
- Material,
- Brand Name and Manufacturer.

D-3c(1)(b) Soil Liner: 40 CFR 270.18(c)(1), 264.251(a), 264.251(c)(1)(i)(B)

Provide a description of the soil portion of the bottom composite liner including its classification, thickness, and hydraulic conductivity. The composite bottom liner must

consist of at least two components. The upper component must be designed and constructed of materials (e.g., a geomembrane) to prevent migration of hazardous constituents during the active life and post-closure period. The lower component must be constructed at least 3 feet of compacted soil material. Indicate if the soil component is in-place material or if borrow material will be used. For in-place soil, indicate if the soil will be re-compacted or amended in any way. For borrow material provide a plan showing the location of the borrow area and indicate if the soil will be amended in any way. When analyzing the soil component, the compacted soil must provide a hydraulic conductivity of not more than  $1 \times 10^{-7}$  cm/sec.

For soil liners constructed of borrow material, provide specifications for the soil material. For soil liners using in-place soil, provide specifications to be used to assure that all existing materials meet the requirements of the liner design. Provide a testing procedures for determining in situ permeability of the soil liner after construction. Also provide a criteria for approval of the material before placement of additional components of the liner system. For soil liners that use amended soil, provide material specifications for the amended material. The soil liner material specifications should indicate the maximum particle size (this is critical for a synthetic liner placed directly on the soil liner) and call for the removal of roots and other unsuitable material.

D-3c(2) Liner Location Relative to High Water Table: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)

Provide data showing seasonal fluctuations in the depth to the water table and the location of the seasonal high water table in relation to the liner system.

D-3c(3) Calculation of Required Soil Liner Thickness: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)

Demonstrate that the thickness of the soil liner is sufficient to retard liquid flow through it such that leachate would be wholly contained throughout the active life of the unit. Calculations using either numerical simulation techniques (unsaturated flow conditions) or Darcy's Law-derived transit time equations (saturated flow conditions) must be provided.

D-3c(4) Liner Strength Requirements: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)

Provide the results of calculations defining the minimum strength requirement for liners considering:

- Internal and external pressure gradients;
- Stresses resulting from settlement, compression or uplift;
- Climatic conditions (freeze-thaw stress);
- Installation stresses; and
- Operating stresses.

D-3c(5) Liner Strength Demonstration: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)

Provide data showing that the liner exceeds the calculated minimum strength requirement.

- D-3c(6)      Liner/Waste Compatibility Testing Results: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)
- Provide the results of liner/waste compatibility testing demonstrating that liner strength and performance are still adequate after exposure to waste leachates. Both primary and secondary leachates must be used in this testing.
- D-3c(7)      Liner Installation: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)
- Describe the procedures for installing the liner(s).
- D-3c(7)(a)      Synthetic Liner Seaming: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)
- Describe the techniques to be used to bond membrane liner seams and the strength and chemical compatibility of the seams with waste leachate.
- D-3c(7)(b)      Soil Liner Compaction: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)
- Describe the procedures for installing the soil liner and compacting the liner to achieve the desired permeability. Include the maximum height of lifts to be placed.
- D-3c(7)(c)      Installation Inspection/Testing Programs: 40 CFR 270.18(c)(1), 264.254(a)
- Describe the inspection, monitoring, sampling and testing methods (and frequencies) to be employed during liner installation to assure that the liner system as installed meets the design requirements.
- D-3c(8)      Liner Coverage: 40 CFR 270.18(c)(1), 264.251(a)(1)(iii)
- Demonstrate that the liner will be installed to cover all surrounding earth likely to be in contact with the waste or leachate.
- D-3c(9)      Liner Exposure Prevention: 40 CFR 270.18(c), 264.251(a)(1)(i)
- Demonstrate that the liner will not be exposed to wind or sunlight or, if exposure is to be permitted, that such exposure will not result in unacceptable liner degradation.
- D-3c(10)      Synthetic Liner Bedding: 40 CFR 270.18(c)(1), 264.251(a)(1)(i)
- Demonstrate that sufficient bedding will be provided above and below the liner to prevent rupture during installation and operation.
- D-3d      Liner Foundation Report
- D-3d(1)      Liner Foundation Design Description: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)
- Describe the liner foundation design and materials of construction. Describe the capability of the foundation to support any expected static and dynamic loadings.

D-3d(2)      Subsurface Exploration Data: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

The engineering characteristics of the foundation materials must be verified through subsurface explorations. These efforts must be described and include:

- Test borings;
- Test pits or trenches;
- In situ tests; and
- Geophysical exploration methods.

D-3d(3)      Laboratory Testing Data: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

Results from sufficient index testing must be provided to classify the site materials. Other lab test data must be provided to evaluate the engineering properties of the foundation materials, particularly for strength, hydraulic conductivity, compressibility, and other important design parameters.

D-3d(4)      Engineering Analyses: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

Engineering analyses must be provided that are based on the data gathered through subsurface exploration and laboratory testing programs. With the analyses, include a discussion of the methods used, assumptions, copies of calculations, and appropriate references.

D-3d(4)(a)      Settlement Potential: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

Provide estimates of the total and differential settlement, including immediate settlement, primary consolidation and secondary consolidation. Stresses imposed by liners, wastes and equipment must be considered.

D-3d(4)(b)      Bearing Capacity and Stability: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

Provide estimates of the bearing capacity and stability of the foundation, demonstrating that allowable bearing capacity will not be exceeded.

D-3d(4)(c)      Potential for Bottom Heave or Blow-out: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

Provide estimates of the potential for bottom heave or blow-out due to unequal hydrostatic or gas pressures.

D-3d(4)(d)      Construction and Operational Loading: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

Demonstrate that the foundation is capable of providing adequate support for construction equipment and operating equipment (e.g., dredges).

D-3d(5)      Foundation Installation Procedures: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)

For installed foundations, provide a description of the foundation installation procedures.

- D-3d(6)      Foundation Installation Inspection Program: 40 CFR 270.18(c)(1), 264.251(a)(1)(ii)
- Describe the inspection, monitoring, sampling and testing methods (and frequencies) to be employed during foundation installation to assure that the foundation as installed meets the design requirements.
- D-3e      Leachate Collection and Removal System: 40 CFR 270.18(c), 264.251(a)(2), 264.251(c)
- Provide information describing the design and operation of a system to collect and remove leachate from new portions of existing waste piles and from new waste piles.
- D-3e(1)      Upper Leachate Collection and Removal System: 40 CFR 270.18(c)(1), 264.251(a)(2), 264.251(c)(2)
- Describe the design and operating features of the leachate collection and removal system. The leachate collection and removal system immediately above the top liner must be designed, constructed, operated, and maintained to collect and remove leachate from the waste pile during the active life and post-closure period. Describe design and operating conditions that will ensure that the leachate depth over the liner does not exceed one foot.
- D-3e(2)      Leachate Detection System: 40 CFR 270.18(c)(1), 264.251(a)(2), 264.251(c)(3)
- The leachate collection and removal system between the liners, and immediately above the bottom composite liner in the case of multiple leachate collection and removal systems, must serve as the leak detection system. Describe the design and operating features of the leachate detection system.
- D-3e(2)(a)      Grading and Drainage: 40 CFR 270.18(c)(1), 264.251(a)(2), 264.221(c)(2)(ii)
- Describe the leak detection system drainage material. The detection system must be constructed of granular drainage materials with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec or more and a thickness of 12 inches or more; or the detection system must be constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-5}$  m<sup>2</sup>/sec or more.
- Indicate the slopes of the leak detection system and provide a contour plan for the system along with a plan showing the layout and spacing of the piping system. The leachate detection system must be constructed with a bottom slope of 1% or more. Demonstrate that the system is appropriately graded to assure that leakage at any point is detected in a timely matter.
- Provide complete details of the piping system and demonstrate that the pipes and pipe perforations are sized sufficiently to handle the expected flow of leachate. Provide sufficient piping to provide for rapid and timely detection of any leakage. The leachate detection system sumps must be separate from any waste pile liquids collection system sumps and must have provisions for measuring the quantity of collected leachate or leakage.



- D-3e(3)      Chemical Resistance: 40 CFR 270.18(c), 264.251(a)(2)(i)(A), 264.251(c)(3)
- Demonstrate that all leachate collection and removal system components are chemically resistant to the waste managed in the pile and leachate expected to be generated.
- D-3e(4)      Strength of Materials: 40 CFR 270.18(c), 264.251(a)(2)(i)(B), 264.251(c)(3)
- Demonstrate that system components are of sufficient strength and thickness to prevent collapse under expected static and dynamic loadings.
- D-3e(5)      Prevention of Clogging: 40 CFR 270.18(c), 264.251(a)(2)(ii), 264.251(c)(3)
- Demonstrate the leachate collection and removal system design and operation will prevent clogging the active life and post-closure period of the waste pile. Consideration must be given to physical, chemical, and/or biological clogging. As an alternative, describe how clogging would be detected and what clean-out procedures would be used to restore the capacity of the system. Include calculations demonstrating the effectiveness of the protection material or system.
- D-3e(6)      Installation: 40 CFR 270.18(c), 264.251(a)(2)
- Describe the methods to be employed to install the leachate collection and removal system. Include a description of the inspection program to be implemented to assure installation in accordance with design requirements.
- D-3e(7)      Maintenance: 40 CFR 270.18(c), 264.251(a)(2)
- Describe anticipated maintenance activities that will be used to assure proper leachate management system operation throughout the pile's expected active life.
- D-3e(8)      Liquid Removal: 40 CFR 270.18(c), 264.221(c)(4)
- Describe the sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit must have its own sump. Each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.
- Indicate that the owner/operator will collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner. Indicate the fate of the collected leachate, which is considered a hazardous waste.
- D-3e(9)      Location Relative to Water Table: 40 CFR 270.18(c)(1)(iii ), 264.251(c)(5)
- The owner/operator of a leak detection system that is not located completely above seasonal high water table must demonstrate that the operation of the leak detection system will not be adversely affected by the presence of groundwater.

D-3f            Action Leakage Rate: 40 CFR 270.18(c)(1)(v), 264.252

D-3f(1)        Determination of Action Leakage Rate: 40 CFR 270.18(c)(1)(v), 264.252(a)

Identify the action leakage rate for waste pile units subject to the liner system provisions of 264.251(c) and 264.251(d). The action leakage rate shall be defined as the maximum design flow rate that the leak detection system (i.e., the lowermost leachate collection and removal system) can remove without the fluid head on the bottom liner exceeding 1 foot. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design, construction, operation, and location of the leak detection system, waste and leachate characteristics, sources of other liquids in the system, and proposed response actions.

D-3f(2)        Monitoring of Leakage: 40 CFR 270.18(c)(1)(v), 264.252(b)

To determine if the action leakage rate has been exceeded, the owner/operator must convert the required leachate flow rate monitoring data (see checklist Section F-2b(3)(c)) to an average daily flow rate (gallons per acre per day) for each sump. This average daily flow rate (or an alternate calculation, if approved by the Regional Administrator) must be calculated weekly during the active life of the facility and closure period, and monthly during the post-closure care period.

D-3g            Leakage Response Action Plan: 40 CFR 270.18(c)(1)(v), 264.253

D-3g(1)        Response Action: 40 CFR 270.18(c)(1)(v), 264.253(a)

Provide a response action plan for waste piles subject to the liner system provisions of 264.221(c) or 264.221(d). The response action plan must describe the actions to be taken if flow rate into the leak detection system exceeds the action leakage rate.

D-3g(2)        Leak and/or Remedial Determinations: 40 CFR 270.18(c)(1)(v), 264.223(b), 264.223(c)

The response action plan must outline procedures to determine, to the extent practicable, (1) the location, size, and cause of any leak; (2) whether waste receipt should cease or be curtailed; (3) whether waste should be removed from the unit for inspection, repairs, or controls; (4) whether the unit should be closed; (5) other short-term or longer-term actions to be taken to mitigate or stop leaks.

To make leak and/or remediation determinations, the owner/operator must (1) assess the source of the liquids and amounts of liquids by source, (2) conduct a fingerprint, hazardous constituent, or other analyses of the liquids to identify the source and possible location of any leaks and the hazard and mobility of the liquid, and (3) assess the seriousness of any leaks in terms of potential for escaping into the environment. Alternatively, the owner/operator may document why such assessments are not needed.

D-3g(3)        Notifications: 40 CFR 270.18(c)(1)(v), 264.253(b)

The response action plan must indicate that the Regional Administrator will be: (1) notified in writing within 7 days of determining that the action leakage rate has been exceeded; (2) provided with a preliminary assessment and action plan within 14 days of the initial determination that the action leakage rate has been exceeded; and (3) receive a status report within 30 days after the original notification that the action leakage rate has been exceeded. The Regional Administrator must receive monthly status reports for as long as the flow rate exceeds the action leakage rate.

D-3h      Run-on Control System: 40 CFR 270.18(c)(2), 264.251(g)

Describe the system that will be used to prevent run-on into active portions of piles.

D-3h(1)      Calculation of Peak Flow: 40 CFR 270.18(c)(2), 264.251(g)

Identify the peak surface water flow expected to result from a 25-year design storm. Describe the data sources and methods used to make the peak flow calculation.

D-3h(2)      Design and Performance: 40 CFR 270.18(c)(2), 264.251(g)

Describe the run-on control system design. Demonstrate that system design will prevent run-on from reaching active portions of the unit.

D-3h(3)      Construction: 40 CFR 270.18(c)(2), 264.251(g)

Describe the methods to be employed to construct the run-on control system. Include descriptions of any construction inspection program to be used to assure construction in accordance with design requirements.

D-3h(4)      Maintenance: 40 CFR 270.18(c)(2), 264.251(g)

Describe any maintenance activities required to assure continued proper run-on system operation throughout the units's active life.

D-3i      Run-off Control System: 40 CFR 270.18(c)(3), 264.251(h)

Describe the run-off control system to be used to collect and control run-off from active portions.

D-3i(1)      Calculation of Peak Flow: 40 CFR 270.18(c)(3), 264.251(h)

Identify the total run-off volume expected to result from a 24-hour, 25-year storm. Describe data sources and methods used to make the peak flow calculation.

D-3i(2)      Design and Performance: 40 CFR 270.18(c)(3), 264.251(h)

Describe the run-off collection and control system design. Demonstrate that the system has sufficient capacity to collect and hold the total run-off volume calculated in D-3g(1).

- D-3i(3)      Construction: 40 CFR 270.18(c)(3), 264.251(h)
- Describe the methods to be employed to construct the run-off collection and control system. Include descriptions of any construction inspection program to be employed to assure construction in accordance with design requirements.
- D-3i(4)      Maintenance: 40 CFR 270.18(c)(3), 264.251(h)
- Describe any maintenance activities required to assure continued proper run-off system operation throughout the unit's active life.
- D-3j      Management of Collection and Holding Units: 40 CFR 270.18(c)(4), 264.251(i)
- Describe how collection and holding facilities associated with run-on and run-off control systems will be emptied or otherwise managed expeditiously after storms to maintain system design capacity.
- D-3k      Control of Wind Dispersal: 40 CFR 270.18(c)(5), 264.251(j)
- If the pile contains any particulate matter that may be subject to wind dispersal, describe how the pile is covered or otherwise managed to control wind dispersal.
- D-3l      Groundwater Monitoring Exemption: 40 CFR 270.18(b), 264.90(b)(2)
- In an exemption from the Subpart F groundwater monitoring requirements is sought, provide data demonstrating that the following conditions are met.
- D-3l(1)      Engineered Structure: 40 CFR 264.90(b)(2)(i)
- Provide design data showing that the unit for which the exemption is sought is an engineered structure.
- D-3l(2)      No Liquid Waste: 40 CFR 264.90(b)(2)(ii)
- Describe procedures for ensuring that no liquid waste or waste containing free liquids will be received by or contained in the unit.
- D-3l(3)      Exclusion of liquids: 40 CFR 264.90(b)(2)(iii)
- Providing design and operating data demonstrating how liquids, precipitation and other run-on and run-off will be excluded from the unit.
- D-3l(4)      Containment System: 40 CFR 264.90(b)(2)(iv)
- Describe the containment system (both inner and outer layers) that will enclose the waste.
- D-3l(5)      Leak Detection System: 40 CFR 264.90(b)(2)(v)

Describe the design and operating data demonstrating the leak detection system built into each containment layer.

D-3l(6) Operation of Leak Detection System: 40 CFR 264.90(b)(2)(vi)

Demonstrate the means for ensuring continuing operation and maintenance of the leak detection systems during the active life of the unit and the closure and post-closure care periods.

D-3l(7) No Migration: 40 CFR 264.90(b)(2)(vii)

Demonstrate to a reasonable degree of certainty, that the unit will not allow hazardous constituents to migrate beyond the outer layer of the containment system prior to the end of the post-closure care period.

D-3m Treatment Within the Pile: 40 CFR 270.18(e)

If any treatment is accomplished in the pile, provide the following descriptions.

D-3m(1) Treatment Process Description: 40 CFR 270.18(e)

Describe the process by which wastes are treated and the effect of the treatment on the wastes.

D-3m(2) Equipment Used: 40 CFR 270.18(e)

Describe any equipment or other materials required to initiate or promote treatment.

D-3m(3) Residuals Description: 40 CFR 270.18(e)

Describe the nature and quantity of the wastes remaining in the pile after treatment is complete.

D-3n Special Waste Management Plan for Piles Containing Waste F020, F021, F022, F023, F026, and F027: 40 CFR 264.259, 270.18(i)

If the waste pile is not enclosed, [i.e., does not meet the requirements of D-3b(1)(a) through D-3b (1)(c)] and will contain wastes F020, F021, F022, F023, F026, and F027, provide a plan describing how the pile is or will be designed, constructed, operated, and maintained in order to protect human health and the environment. The plan must address the following factors.

D-3n(1) Waste Description: 40 CFR 264.259(a)(1), 270.18(i)(1)

Identify the volume, physical, and chemical characteristics of the waste including their potential to migrate through the soil or volatilize or escape into the atmosphere.

D-3n(2) Soil Description: 40 CFR 264.259(a)(2), 270.18(i)(2)

Describe the attenuative properties of underlying and surrounding soils or other materials.

D-3n(3) Mobilizing Properties: 40 CFR 264.259(a)(3), 270.18(i)(3)

Describe the mobilizing properties of other materials co-disposed with these wastes.

D-3n(4) Additional Management Techniques: 40 CFR 264.259(a)(4), 270.18(i)(4)

Document the effectiveness of additional treatment, design, operating or monitoring techniques.

D-3o Construction Quality Assurance Program: 40 CFR 270.18(c)(iv), 264.19

Provide a written Construction Quality Assurance (CQA) Program that will ensure the constructed unit meets or exceeds all design criteria and specifications. The program must be developed and implemented under the direction of a CQA officer who is a registered professional engineer. The CQA Program must:

- Identify all applicable units and provide a description of how they will be constructed;
- Identify key personnel and provide CQA officer qualifications;
- Describe observations, inspections, tests, and measurements sufficient to ensure the structural stability and integrity of (as appropriate) all foundations, dikes, low permeability soil liners, geomembranes, leachate collection and removal systems, and leak detection systems;
- Describe observations, inspections, tests, and measurements to ensure proper construction and installation (as appropriate) of liners, leachate collection and removal system, leak detection system, and final cover system;
- Describe observations, inspections, tests, and measurements to ensure conformity of all materials used, in accordance with design and other material specifications; and
- Describe test fills for completed soil liners using same method as in the full scale unit to ensure hydraulic conductivity requirements are met.

Provide a statement that waste shall not be received in the unit the owner/operator has certified that the CQA program has been successfully carried out and that the unit meets construction requirements.

D-4 Surface Impoundments

D-4a List of Wastes: 40 CFR 270.17(a)

Provide a list of all hazardous wastes placed or to be placed in surface impoundments.

D-4b Liner System Exemption Requests

D-4b(1) Exemption Based on Existing Portion: 40 CFR 270.17(b)(1), 264.221(c)

Existing portions of surface impoundments that have waste in place on November 8, 1984 and will have only vertical expansion are exempted from liner system requirements (items D-4c through D-4g). New units, lateral expansion of existing units, and replacement (i.e., all waste removed from an area and then replaced) units at existing facilities are not exempt. Provide a plan indicating the limits of the existing portions.

D-4b(2) Exemption Based on Alternative Design and Location: 40 CFR 270.17(b)(1), 264.221(d)

If an exemption from the double liner and leachate detection system is requested based on an alternative design, document that the alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituent into the ground or surface water at least as effectively as a double liner with leachate detection system, and will allow detection of hazardous constituents through the top liner as least as effectively.

D-4b(3) Exemption for Replacement Surface Impoundments: 40 CFR 264.221(f)

If the owner/operator of a replacement surface impoundment seeks an exemption from the required liner system (top liner, composite lower liner, and leachate collection and removal system), demonstrate (1) that the existing unit was constructed in compliance with the design standards of Sections 3004(o)(1)(A)(i) and 3004(o)(5) of RCRA; and (2) there is no reason to believe that the liner is not functioning as designed.

D-4c Liner System, General Items: 40 CFR 270.17(b)(1)

Provides a discussion of the following items that apply to the liner system as a whole.

D-4c(1) Liner System Description: 40 CFR 270.17(b)(1)

Provide a detailed description of the liner system, demonstrating (by description and drawings) that any flow of liquids into and through the liners will be prevented. For each liner within the system (minimum one upper synthetic liner and one lower composite synthetic/soil liner); describe the type of liner, its material and its thickness. The liner system includes the liner foundation, composite liner, leachate detection system, top synthetic liner, and any protective layer placed to protect the top synthetic liner from damage.

D-4c(2) Liner System Location Relative to High Water Table: 40 CFR 270.17(b)(1), 270.17(b)(3), 264.221(a)

Provide data showing seasonal fluctuations in the depth to the water table and the location of the seasonal high water table in relation to the base of the liner system (i.e., groundwater levels and liner foundation elevations should be shown on geological cross sections).

D-4c(3) Load on Liner System: 40 CFR 270.17(b)(1), 264.221(a)(1)

Provide the results of calculations defining the maximum loads or stresses that will be placed on the liner system considering:

- Both static and dynamic loads;
- Stresses due to installation or construction operations;
- Stresses resulting from operating equipment;
- Stresses due to the maximum quantity of waste, cover, and proposed post-closure land use;
- Stresses resulting from settlement, compression, subsidence, or uplift; and
- Internal and external pressure gradients.

D-4c(4) Liner System Coverage: 40 CFR 270.17(b)(1), 264.221(a)(1)

Demonstrate that the liner system will be installed to cover all surrounding earth likely to be in contact with the waste or leachate (i.e., construction, as built, or detailed drawings).

D-4c(5) Liner System Exposure Prevention: 40 CFR 270.17(b)(1), 264.221(a)(1)

Demonstrate that the liner system will not be exposed to wind or sunlight or, if exposure to any part of the system is to be permitted, that such exposure will not result in unacceptable degradation of that portion of the system (i.e., drawings and/or liner specifications as appropriate). If the liner system will be exposed or located close enough to the surface to be affected by changing temperatures, provide calculations defining the stresses on the liner system due to thermal expansion and contraction.

D-4d Liner System, Foundation

D-4d(1) Foundation Description: 40 CFR 270.17(b)(1), 264.221(a)(2)

Describe the foundation for the liner system, including the foundation materials and indicate bearing elevations on geological and construction drawings. Indicate any load bearing embankments placed to support the liner system.

D-4d(2) Surface Exploration Data: 40 CFR 270.17(b)(1), 264.221(a)(2)

The engineering characteristics of the liner system foundation materials, including subsurface soil, bedrock, and hydrogeologic conditions should be verified through subsurface explorations. These efforts should be fully described by including location plans and cross sections for test borings, test pits, etc., and descriptions or references for the procedures used, and may include:

- Historical data;
- Test borings;
- Test pits or trenches;
- In situ tests; and/or
- Geophysical exploration methods.



D-4d(3)      Laboratory Testing Data: 40 CFR 270.17(b)(1), 264.221(a)(2)

Results from sufficient index testing should be provided to classify the site materials. Other lab test data should be provided to evaluate the engineering properties of the foundation materials, particularly for strength, hydraulic conductivity, compressibility, and other important design parameters. Provide copies of the test methods used to test the material or provide references, as appropriate and with any revisions, to standard test procedures.

D-4d(4)      Engineering Analyses: 40 CFR 270.17(b)(1), 264.221(a)(2)

Engineering analyses should be provided that are based on the data gathered through subsurface exploration and laboratory testing programs. With the analyses include a discussion of the methods used, assumptions, copies of calculations, and appropriate references. Included, as appropriate, may be discussion on:

- Settlement potential;
- Bearing capacity;
- Potential for excess hydrostatic or gas pressure [Item D-4d(4)(c)];
- Seismic conditions;
- Subsidence potential; and
- Sinkhole potential.

Provide an analysis of the cut and constructed slope stability as per item D-4k.

D-4d(4)(a)      Settlement Potential: 40 CFR 270.17(b)(1), 264.221(a)(2)

Provide estimates of the total and differential settlement of the liner system foundation, including immediate settlement, primary consolidation and secondary consolidation. When performing the analyses, consider the stresses imposed by the liner system and the applicable stresses computed in item D-4c(3).

D-4d(4)(b)      Bearing Capacity: 40 CFR 270.17(b)(1), 264.221(a)(2)

Provide an analysis of the allowable bearing capacity of the liner system foundation. Compare the allowable capacity to the required bearing capacity based on the loads imposed by the liner system and the applicable loads computed in item D-4c(3).

D-4d(4)(c)      Potential for Excess Hydrostatic or Gas Pressure: 40 CFR 270.17(b)(1), 264.221(a)(2)

Provide estimates of the potential for bottom heave or blow-out of the liner system or liner foundation due to unequal hydrostatic or gas pressures.

D-4e      Liner System, Liners

D-4e(1)      Synthetic Liners: 40 CFR 270.17(b)(1), 264.221(a) and (c)

For each synthetic liner in the system provide the following general information:

- Thickness;
- Type;
- Material;
- Brand name; and
- Manufacturer.

Provide data for all synthetic liners under consideration. Detailed synthetic liner material specifications must also be provided as per item D-4g(1)(a).

D-4e(1)(a) Synthetic Liner Compatibility Data: 40 CFR 270.17(b)(1), 264.221(a)(1)

Provide the results of liner/waste compatibility testing demonstrating that liner strength and performance are still adequate after exposure to waste leachates and to the waste. Both primary and secondary leachates should be used in this testing.

Provide a detailed description of the testing procedures used, or if appropriate reference a standard test method, along with complete test results. Describe how the waste and waste leachate samples were prepared or obtained and demonstrate that they were representative of what the liner will be exposed to within the surface impoundment. Provide a summary and discussion of the test results and conclusions as to the suitability of the synthetic liner.

D-4e(1)(b) Synthetic Liner Strength:

Provide data showing the synthetic liners have sufficient strength after exposure to the waste and waste leachate to support the loads/stresses as computed in item D-4c(3) (i.e., consider tensile stresses resulting from settlement). Also demonstrate that the liner seams will have sufficient strength.

D-4e(1)(c) Synthetic Liner Bedding: 40 CFR 270.17(b)(1), 264.221(a)(2)

Demonstrate that sufficient bedding will be provided above and below the synthetic liners to prevent rupture of the synthetic liner during installation and operation (i.e., thickness and radiation).

Note: The synthetic membrane of a bottom composite liner should be placed directly on the soil portion.

D-4e(2) Soil Liners: 40 CFR 270.17(b)(1), 264.221(a), 264.221(c)(1)

Provide a description of the soil portion of the bottom composite liner including its classification, thickness and hydraulic conductivity. The upper component must be designed and constructed of materials (e.g. geomembrane) to prevent migration of hazardous constituents during the active life and post-closure period of the surface impoundment. The lower component must be constructed of at least 3 feet of compacted soil material. Indicate if the soil liner is in-place material or if borrow material will be used. For in-place soil, indicate if the soil will be re-compacted or amended in any way. For borrow material provide a plan showing the location of the

borrow area and indicate if the soil will be re-compacted or amended in any way. When analyzing the soil liner assume the synthetic liners have leaked, thus exposing the soil liner to the waste leachate.

Note: To be considered as a soil liner, in situ soil must be re-compacted or reworked to provide a hydraulic conductivity of not more than  $1 \times 10^{-7}$  cm/sec. Detailed soil liner material specifications must also be provided.

D-4e(2)(a) Material Testing Data: 40 CFR 270.17(b)(1), 264.221(c)

Provide test results for index tests, laboratory and/or in situ hydraulic conductivity (permeability) tests, strength tests, consolidation tests, and shrink-swell properties of the soil liner material. Provide copies of the test procedures, or if appropriate reference standard test methods, along with complete test results. Discuss the potential for dispersion and piping of the soil due to flow of liquid through the soil liner layer.

D-4e(2)(b) Soil Liner Compatibility Data: 40 CFR 270.17(b)(1), 264.221(a)(1)

Provide the results of permeability testing of the soil liner material using leachate representative of the leachate that the surface impoundment could generate. Discuss the effects, if any, of the leachate on the soil permeability. Provide a copy of the test procedures, or reference appropriate standard test methods, along with a description of how the leachate samples were prepared or obtained, a demonstration that the leachate sample is representative, and the complete test results.

D-4e(2)(c) Soil Liner Strength: 40 CFR 270.17(b)(1), 264.221(a)(1)

Demonstrate that the soil liner has sufficient strength to support the loads/stresses computed in checklist item D-4c(3).

Note: Low permeability in some cases is achieved at the expense of adequate strength.

D-4f Liner System, Leachate Detection System: 40 CFR 270.17(b)(1), 264.221(c)(2)

Provide the following information about the leachate detection system located between the two liners. Provide detailed material specifications as per item D-g4(1)(c).

D-4f(1) Systems Operation and Design: 40 CFR 270.17(b)(1), 264.221(c)(2), 264.221(c)(4)

Describe the design features of the leachate detection system and how the system will function to detect any leakage through either liner in a timely manner.

D-4f(2) Drainage Material: 40 CFR 270.17(b)(1), 264.221(c)(2)(ii)

Describe the leachate detection system drainage material. The detection system must be constructed of granular drainage materials with a hydraulic conductivity of  $1 \times 10^{-1}$  cm/sec or more and a thickness of 12 inches or more; or the detection system must be

constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-4}$  m<sup>2</sup>/sec or more.

D-4f(3)      Grading and Drainage: 40 CFR 270.17(b)(1), 264.221(c)(2)

Indicate the slopes of the leachate detection system and provide a contour plan for the system along with a plan showing the layout and spacing of the piping system. The leachate detection system must be constructed with a bottom slope of 1% or more. Demonstrate that the leak detection system is appropriately graded to assure that leakage at any point in the liner system is detected in a timely manner.

Provide complete details of the piping system, along with any sumps, pumps, etc. and demonstrate that the pipes and pipe perforations are sized sufficiently to handle the expected flow of leachate. Provide sufficient piping to provide for rapid and timely detection of any leakage. The leachate detection system sumps must be separate from any impoundment liquid collection system sumps and must have provisions for measuring the quantity of collected leachate or leakage.

D-4f(4)      System Compatibility: 40 CFR 270.17(b)(1), 264.221(c)(2)(iii)

Demonstrate that all components of the leachate detection system are chemically resistant to the waste managed in the surface impoundment and the leachate expected to be generated.

D-4f(5)      System Strength

D-4f(5)(a)      Stability of Drainage Layers: 40 CFR 270.17(b)(1), 264.221(c)(2)(ii)

Demonstrate that the drainage layer of the leachate detection system has sufficient strength to support the loads and stresses computed in item D-4c(3) (i.e., sufficient soil bearing capacity to support loads). Demonstrate (by providing calculations) that the drainage layer placed on sloped surfaces of the surface impoundment or foundations will be stable during construction.

D-4f(5)(b)      Strength of Piping: 40 CFR 270.17(b)(1), 264.221(c)(2)(ii)

Demonstrate that the pipe used in the piping systems has sufficient strength (crushing or deflection as appropriate) to support the loads computed in item D-4c(3).

D-4f(6)      Prevention of Clogging: 40 CFR 270.17(b)(1), 264.221(c)(2)(iv)

Demonstrate that the leachate detection system is designed and operated to prevent clogging of the drainage layer material or the pipes throughout the active life of the surface impoundment. Consideration must be given to physical, chemical and/or biological clogging. As an alternative, describe how clogging would be detected and what clean-out procedures would be used to restore the capacity of the system. Include calculations demonstrating the effectiveness of the protection material or system.

D-4f(7)      Liquid Removal: 40 CFR 270.17(b)(1), 264.221(c)(2)(v), 264.221(c)(3)

Describe the sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit must have its own sump. Each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.

Indicate that the owner/operator will collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner. Indicate the fate of the collected leachate, which is considered a hazardous waste.

D-4f(8)      Location Relative to Water Table: 40 CFR 270.17(b)(3), 264.221(c)(4)

The owner/operator of a leak detection system that is not located completely above the seasonal high water table must demonstrate that the operation of the leak detection system will not be adversely affected by the presence of groundwater.

D-4g      Liner System, Construction and Maintenance

D-4g(1)      Material Specifications

D-4g(1)(a)      Synthetic Liners: 40 CFR 270.17(b)(1), 264.221(a)

Provide detailed material specifications for the specific synthetic liner or liners to be used.

D-4g(1)(b)      Soil Liners: 40 CFR 270.17(b)(1), 264.221(a)

For soil liners constructed of borrow material, provide specifications for the soil material. For soil liners using in-place soil, provide specifications to be used to assure that all existing materials meet the requirements of the liner design. Provide a testing procedure for determining in situ permeability of the soil liner after construction. Also provide a criteria for approval of the material before placement of additional components of the liner system. For soil liners that use amended soil, provide material specifications for the amended material. The soil liner material specifications should indicate the maximum partial size (this is very critical for a synthetic liner placed directly on the soil liner) and call for the removal of roots and other unsuitable material.

D-4g(1)(c)      Leachate Detection System: 40 CFR 270.17(b)(1), 264.221(a)

Provide material specifications for:

- Drainage layer material;
- Filter fabric or filter layer;
- Piping; and
- Sumps.

D-4g(2)      Construction Specifications

D-4g(2)(a)      Liner System Foundation: 40 CFR 270.17(b)(1), 264.221(a)

For installed foundations, provide construction specifications of the foundation installation procedures. For units that use the in-place material for the liner system foundation, provide construction specifications for preparation of the liner system foundation.

D-4g(2)(b)      Soil Liner: 40 CFR 270.17(b)(1), 264.221(a), 264.226(a)(2)

Describe the procedures for installing the soil liner. Include:

- Method of compaction;
- Degree of compaction and percent moisture content that must be achieved;
- Lift thickness;
- Methods to be used to alter the water content of the soil;
- Scarification requirement between lifts; and
- If applicable, method of amending the soil.

D-4g(2)(c)      Synthetic Liners: 40 CFR 270.17(b)(1), 264.221(a), 264.226(a)(1)

Provide construction specifications for placement of the synthetic liners which include:

- Inspection of the synthetic liner bed for material which could puncture the liner (and removal of that material);
- Placement procedures;
- Techniques to be used to bond the liner seams;
- Procedures for protection of the liner before and during placement of material on top of the liner; and
- Any protective layer placed to protect the liner during operations.

D-4g(2)(d)      Leachate Detection System: 40 CFR 270.17(b)(1), 264.221(a)

Provide construction specifications for placement of all components of the leachate detection system, including:

- Drainage layers;
- Piping;
- Sumps, pumps, etc.; and
- Filter types.

D-4g(3)      Construction Quality Assurance Program: 40 CFR 270.17(b)(1), 270.17(b)(4), 270.30(k)(2), 264.19, 264.226(a)

Provide complete details of the Construction Quality Assurance (CQA) Program to be used during construction of the liner system to assure that it is built as designed. Include a description of all testing procedures such as testing of the synthetic liner seams, in situ

permeability testing of the soil liner, compaction control for the soil liner, etc. Indicate if the owner or the contractor will perform the testing and inspection and indicate the necessary qualifications of the testing and inspection personnel.

The program must be developed and implemented under the direction of a CQA officer who is a registered professional engineer. The CQA Program must:

- Identify all applicable units and provide a description of how they will be constructed;
- Identify key personnel and provide CQA officer qualifications;
- Describe observations, inspections, tests and measurements sufficient to ensure the structural stability and integrity of all foundations, dikes, low permeability soil liners, geomembranes, leachate collection and removal systems, and leak detection systems;
- Describe observations, inspections, tests, and measurements to ensure proper construction and installation (as appropriate) of liners, leachate collection and removal systems, leak detection systems, and final cover systems;
- Describe observations, inspections, tests, and measurements to ensure conformity of all materials used, in accordance with design and other material specifications; and
- Describe test fills for compacted soil liners using same method as in the full scale unit to ensure hydraulic conductivity requirements are met.

Provide a statement that waste shall not be received in the unit until the owner/operator has certified that the CQA program has been successfully carried out and that the unit meets construction requirements.

D-4g(4)      Maintenance Procedures for Leachate Detection System: 40 CFR 270.17(b)(1), 264.221(a)

Describe the anticipated maintenance activities that will be used to assure proper operation of the leachate detection system throughout the surface impoundment's expected life.

D-4g(5)      Liner Repairs During Operations: 40 CFR 270.17(b)(1), 264.221(a)

Describe the methods that will be used to repair any damage to the liner that occurs while the surface impoundments is in operation (such as a drag line ripping the liner during cleaning operations).

D-4h          Action Leakage Rate: 40 CFR 270.17(b)(5), 264.222

D-4h(1)      Determination of Action Leakage Rate: 40 CFR 270.17(b)(5), 264.222(a)

Identify the action leakage rate for surface impoundment units subject to the liner system provisions of 264.221(c) and 264.221(d). The action leakage rate shall be defined as the maximum design flow rate that the leak detection system (i.e., the leachate collection and removal system) can remove without the fluid head on the bottom liner exceeding

1 foot. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design, construction, operation, and location of the leak detection system, waste and leachate characteristics, sources of other liquids in the system, and proposed response actions.

D-4h(2) Monitoring of Leakage: 40 CFR 270.17(b)(5), 264.222(b)

To determine if the action leakage rate has been exceeded, the owner/operator must convert the required leachate flow rate monitoring data (see checklist Section F-2b(4)(c)) to an average daily flow rate (gallons per acre per day) for each sump. This average daily flow rate (or an alternate calculation, if approved by the Regional Administrator) must be calculated weekly during the active life of the facility and closure period, and monthly during the post-closure care period.

D-4i Leakage Response Action Plan: 40 CFR 264.223

D-4i(1) Response Action: 40 CFR 264.223(a)

Provide a response action plan for surface impoundments subject to the liner system provisions of 264.221(c) or 264.221(d). The response action plan must describe the actions to be taken if flow rate into the leak detection system exceeds the action leakage rate.

D-4i(2) Leakage and/or Remedial Determinations: 40 CFR 264.223(b), 264.223(c)

The response action plan must outline procedures to determine, to the extent practicable, (1) the location, size, and cause of any leak; (2) whether waste receipt should cease or be curtailed; (3) whether waste should be removed from the unit for inspection, repairs, or controls; (4) whether the unit should be closed; and (5) other short-term or longer-term actions to be taken to mitigate or stop leaks.

To make leak and/or remediation determination, the owner/operator must (1) assess the source of the liquids and amounts of liquids by source, (2) conduct a fingerprint, hazardous constituent, or other analyses of the liquids to identify the source and possible location of any leaks and the hazard and mobility of the liquid, and (3) assess the seriousness of any leaks in terms of potential for escaping into the environment. Alternatively, the owner/operator may document why such assessments are not needed.

D-4i(3) Notifications: 40 CFR 264.223(b)

The response action plan must indicate that the Regional Administrator will (1) be notified in writing within 7 days of determining that the action leakage rate has been exceeded; (2) be provided with a preliminary assessment and action plan within 14 days of the initial determination that the action leakage rate has been exceeded; and (3) receive a status report within 30 days after the original notification that the action leakage rate has been exceeded. The Regional Administrator must receive monthly status reports for as long as the flow rate exceeds the action leakage rate.



- D-4j      Prevention of Overtopping: 40 CFR 270.17(b)(2), 264.221(g)
- Describe the design and/or operating procedures that will provide protection against impoundment overtopping/overflow.
- D-4j(1)      Design Features: 40 CFR 270.17(b)(2), 264.221(g)
- Describe the design features used to prevent overtopping, such as:
- Spillways or weirs for flow-through systems;
  - Automatic or manual controls; and
  - Sensors and alarms.
- D-4j(2)      Operating Procedures: 40 CFR 270.17(b)(2), 264.221(g)
- If operating procedures are instrumental to preventing overtopping, provide a description of those procedures.
- D-4j(3)      Overtopping Prevention: 40 CFR 270.17(b)(2), 264.221(g)
- Unless foolproof controls are employed to prevent overtopping, provide the results of calculations showing that adequate freeboard will be available following a 100-year, 24-hour storm. Appropriate calculations include flood routing and show that the peak discharge is greater than the peak inflow, or that there is sufficient storage volume to store the entire design storm and any excess inflow.
- D-4j(4)      Freeboard Requirements: 40 CFR 270.17(b)(2), 264.221(g)
- Freeboard requirements associated with normal and extreme wind activity should be determined unless automatic controls are used and freeboard equals or exceeds two (2) feet.
- D-4j(5)      Outflow Destination: 40 CFR 270.17(b)(2), 264.221(g)
- Describe the fate of liquids released through flow control devices. Identify the location to which wastes would be moved in the event of an emergency.
- D-4k      Dike Stability
- D-4k(1)      Engineer's Certification: 40 CFR 270.17(d), 264.226(c)
- Provide written certification by a qualified engineer attesting to the structural integrity of all dikes. For new units, submit a statement from a qualified engineer that such a certification will be provided upon completion of the new dikes.
- D-4k(2)      Dike Design Description: 40 CFR 270.17(b)(3), 264.221(h)

Provide data and/or drawings specifying design layout of the dikes and their components including materials of construction. Determine the capability of the dikes to withstand failure from expected static and dynamic loadings and effects of erosion.

D-4k(3) Erosion and Piping Protection: 40 CFR 270.17(b)(3), 264.221(h)

Provide demonstration that dikes are designed and constructed to minimize erosion and prevent failure due to excessive erosion. These demonstrations should consider the erosion potential from rainfall, surface waste run-off, any contact between impounded wastes and the dikes, potential leakage (and possible piping) through the dikes, and potential leakage (and possible piping) along conduits or structures through the dike. Describe procedures for correcting erosion problems identified during the unit's operating life.

D-4k(4) Subsurface Soil Conditions: 40 CFR 270.17(b)(3), 264.221(h)

The engineering characteristics of the dike foundation materials should be verified through testing and subsurface explorations, as necessary. These explorations may include:

- Test borings;
- Test pits or trenches;
- In situ tests; and
- Geophysical exploration methods.

D-4k(5) Stability Analysis: 40 CFR 270.17(b)(3), 264.221(h)

Provide a description of, and the results from, stability analyses for the following conditions, as appropriate:

- Foundation soil bearing failure or settlement;
- Failure in the dike slopes;
- Failure of impoundment cut slopes;
- Build-up of hydrostatic pressure due to failure of drainage system, dike cover, and liner; and
- Rapid drawdown.

D-4k(6) Strength and Compressibility Test Results: 40 CFR 270.17(b)(3), 264.221(h)

Provide results of strength and consolidation tests on the dike materials together with a description of the sampling procedures and test methods.

D-4k(7) Dike Construction Procedures: 40 CFR 270.17(b)(3), 264.221(h)

Describe the methods to be used to construct dikes at new units.

D-4k(8) Dike Construction Inspection Program: 40 CFR 270.17(b)(3), 264.221(h)

Describe the inspection, monitoring, sampling and testing methods (and frequencies) to be employed during dike construction to assure that new dikes meet their design requirements.

D-4l Special Waste Management Plan for Surface Impoundments Containing Wastes F020, F021, F022, F023, F026, and F027: 40 CFR 270.17(i)

Provide a plan describing how surface impoundments containing wastes F020, F021, F022, F023, F026, and F027 are or will be designed, constructed, operated, and maintained in order to protect human health and the environment. The plan must address the following factors.

D-4l(1) Waste Description: 40 CFR 270.17(i)(1), 264.231(a)(1)

Identify the volume, physical, and chemical characteristics of the wastes including their potential to migrate through the soil or volatilize or escape into the atmosphere.

D-4l(2) Soil Description: 40 CFR 270.17(i)(2), 264.231(a)(2)

Describe the attenuative properties of underlying and surrounding soils or other materials.

D-4l(3) Mobilizing Properties: 40 CFR 270.17(i)(3), 264.231(a)(3)

Describe the mobilizing properties of other materials co-disposed with these wastes.

D-4l(4) Additional Management Techniques: 40 CFR 270.17(i)(4), 264.231(a)(4)

Document the effectiveness of additional treatment, design, operating, or monitoring techniques.

D-5 Incinerators: 40 CFR 270.19, 264.340 through 264.351

D-5a Justification for Exemption: 40 CFR 270.19(a)

In order to justify an exemption under 264.340(b) or (c), document the following: (1) the waste contains no or insignificant concentrations of Part 261, Appendix VIII materials; and (2) the waste is considered hazardous solely because it is (a) ignitable and/or corrosive or (b) reactive. Exempted reactive wastes are limited to materials that will not liberate toxic fumes or vapors per Sections 261.23(a)(4) and (5) and shall not be burned when other hazardous wastes are present in combustion zone.

A demonstration that the waste contains insignificant quantities of Appendix VIII materials can be based on either: (1) risk assessment that considers dispersion rates, local receptors, and toxicological effects; or (2) relationship of emission to prevent ambient concentrations; or (3) detectability of contaminants in stack gases.

D-5b Trial Burn: 40 CFR 270.19(b)

Submit a trial burn plan that includes the following information.

D-5b(1) Trial Burn Plan: 40 CFR 270.19(b)

Submit a trial burn plan addressing the following information requirements.

D-5b(1)(a) Detailed Engineering Description of Incinerator: 40 CFR 270.62(b)(2)(ii)

Describe, at a minimum: manufacturer's name and model, if available; incinerator type; linear dimensions of incinerator unit, including the cross-sectional area of the combustion chamber; description of auxiliary fuel system (type and feed); prime mover capacity and type; description of the automatic waste feed cut-off system(s); stack gas monitoring and pollution control equipment; nozzle and burner design; construction materials; and location and description of temperature, pressure, and flow indicating and control devices. (A process and instrumentation diagram should be included.)

D-5b(1)(b) Sampling and Monitoring Procedures: 40 CFR 270.62(b)(2)(iii)

Describe sampling and monitoring procedures during the trial burn (i.e., waste feed, fuel feed rate, combustion gas velocity and emission), including sampling and monitoring locations, equipment, frequency, and analytical procedures. EPA approved sampling and analysis methods must be employed or, alternatively, a demonstration of equivalence with EPA approved methods must be made.

Quality assurance/quality control program must be described. Statistical analyses of trial burn data must use 95% confidence limits.

D-5b(1)(c) Trial Burn Schedule: 40 CFR 270.62(b)(2)(iv)

Submit a detailed schedule for each waste for which a trial burn is proposed, including: dates when trial burn(s) are planned; the duration of each trial burn; the quantity of waste to be burned during each trial burn; and any other relevant factors.

D-5b(1)(d) Test Protocols: 40 CFR 270.62(b)(2)(v)

For each waste to be burned, describe ranges in operating conditions that will be tested, including: waste constituents; combustion temperature ranges; waste feed rate; combustion gas velocity; and auxiliary fuel use.

D-5b(1)(e) Pollution Control Equipment Operation: 40 CFR 270.62(b)(2)(vi)

Describe any emission control equipment identified in D-5b(1) and include the planned operating conditions for each.

D-5b(1)(f) Shutdown Procedures: 40 CFR 270.62(b)(2)(vii)

Describe procedures for rapidly stopping waste feed, shutting down the incinerator, and controlling emissions in the event of an equipment malfunction.

D-5c            Data Submitted in Lieu of Trial Burn: 40 CFR 270.19(c)

Provide the following data in lieu of a trial burn plan:

D-5c(1)        Detailed Engineering Description of Incineration: 40 CFR 270.19(c)(2)

Describe, at a minimum: manufacturer's name and model, if available; incinerator type; linear dimensions of incinerator unit, including the cross-sectional area of the combustion chamber; description of auxiliary fuel system (type and feed); prime mover capacity and type; description of the automatic waste feed cut-off system(s); stack gas monitoring and pollution control equipment; nozzle and burner design; construction materials; and location and description of temperature, pressure, and flow indicating and controlled devices. (A process and instrumentation diagram should be included.)

D-5c(2)        Expected Incinerator Operation: 40 CFR 270.19(c)(6)

Submit information on the expected incinerator operation to demonstrate conformance with 264.343 and 264.345 including: expected carbon monoxide level in the stack exhaust gas; waste feed rate; combustion zone temperature; expected stack gas volume, flow rate and temperature; computed residence time for waste in the combustion zone; expected HCI removal efficiency; expected fugitive emissions and their control procedures; and proposed waste feed system cut-off limits based on identified significant operating parameters.

D-5c(3)        Design and Operating Conditions: 40 CFR 270.19(c)(4)

Provide design and operating conditions of the incinerator unit compared with similar information from the unit used to develop data in lieu of trial burn. Information contained in D-5c(1) and D-5c(2) should be used as a basis for comparison.

D-5c(4)        Previous Trial Burn Results: 40 CFR 270.19(c)(5)

Describe the results from all previously conducted, approved trial burns.

D-5c(4)(a)     Sampling and Analysis Techniques: 40 CFR 270.19(c)(5)(i)

Describe the sampling and analysis techniques used to demonstrate performance in past trial burn(s). Unless EPA approved methods are used, the methods must be described and demonstrated to be equivalent with EPA approved methods.

D-5c(4)(b)     Methods and Results: 40 CFR 270.19(c)(5)(ii)

Describe the methods and results of monitoring temperatures, waste feed rates, carbon monoxide, and combustion gas velocity during past trial burn(s) (including a precision and accuracy statement regarding this measurement).

D-5d            Determinations: 40 CFR 270.62(b)(6)

If approved trial burn has already been conducted, or if data in lieu of trial burn is submitted, provide the following determination: quantitative analysis of waste feed POHCs; quantitative analysis of exhaust gas concentrations of trial POHCs, oxygen and HCl; computation of DRE; quantitative analysis of any scrubber water, ash residues and other residues (for use in estimating fate of trial POHCs); computation of HCl removal efficiency (if HCl emission rate exceeds 1.8 kg/hr); identification of fugitive emissions and their means of control; average temperatures; minimum temperatures; combustion gas velocity; and continuous-monitoring results of CO exhaust gas concentrations.

D-6            Landfills: 40 CFR 270.21, 264.300 through 264.317

D-6a           List of Wastes: 40 CFR 270.21(a)

Provide a list of all hazardous wastes placed or to be placed in landfills.

D-6b           Liner System Exemption Requests

D-6b(1)       Exemption Based on Existing Portion: 40 CFR 270.21(b)(1), 264.301(a)

Existing portions of landfills that have waste in place on November 8, 1984 and will have only vertical expansion are exempted from liner system requirements (items D-6 through D-6g). New units, lateral expansion of existing units, and replacement (i.e., all waste removed from an area and then replaced) units at existing facilities are not exempt. Provide a plan showing the limits of the existing portion.

D-6b(2)       Exemption Based on Alternative Design and Location: 40 CFR 270.21(b)(1), 264.301(d)

If an exemption from the double liner and leachate collection and removal system is requested based on an alternative design, document that the alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituent into the ground or surface water at least as effectively as a double liner with leachate collection/detection system, and will allow detection of hazardous constituents through the top liner as least as effectively.

D-6b(3)       Exemption for Replacement Landfill Unit: 40 CFR 270.21(b), 264.301(f)

If the owner/operator of a replacement landfill unit seeks an exemption from the required liner system (top liner, composite lower liner, and leachate collection and removal system), demonstrate (1) that the existing unit was constructed in compliance with the design standards of Sections 3004(o)(1)(A)(i) and 3004(o)(5) of RCRA; and (2) there is no reason to believe that the liner is not functioning as designed.

D-6b(4)       Exemption for Monofills: 40 CFR 270.21(b)(1), 264.301(e)

Demonstrate that the landfill will consist of a monofill receiving only wastes from foundry furnace emission controls or metal casting molding sand that are not hazardous

wastes for reasons other than toxicity characteristics. In addition, demonstrate either of the following:

- The design and operating practices that will, in conjunction with local aspects, prevent the migration of hazardous constituents into ground or surface waters at any future time; or
- The site is located at least one-quarter mile from a source of drinking water, has at least one nonleaking liner, and meets the requirements of 40 CFR 264, Subpart F.

D-6b(5)      Groundwater Monitoring Exemption: 40 CFR 270.21(c), 264.90(b)(2)

If an exemption from the Subpart F groundwater monitoring requirements is sought, provide data demonstrating that all the following conditions are met.

D-6b(5)(a)      Engineered Structure: 40 CFR 270.90(b)(2)(i)

Provide design data showing that the unit for which the exemption is sought is an engineered structure.

D-6b(5)(b)      No Liquid Waste: 40 CFR 264.90(b)(2)(ii)

Describe procedures for ensuring that no liquid waste or waste containing free liquids will be received by or contained in the unit.

D-6b(5)(c)      Exclusion of Liquids: 40 CFR 264.90(b)(2)(iii)

Provide design and operating data demonstrating how liquids, precipitation and other run-on and run-off will be excluded from the unit.

D-6b(5)(d)      Containment System: 40 CFR 264.90(b)(2)(iv)

Describe the containment system (both inner and outer layers) that will enclose the waste.

D-6b(5)(e)      Leak Detection System: 40 CFR 264.90(b)(2)(v)

Describe the design and operating data demonstrating the leak detection system built into each containment layer.

D-6b(5)(f)      Operation of Leak Detection System: 40 CFR 264.90(b)(2)(vi)

Demonstrate the means for ensuring continuing operation and maintenance of the leak detection system during the active life of the unit and the closure and post-closure care periods.

D-6b(5)(g)      No Migration: 40 CFR 264.90(b)(2)(vii)

Demonstrate that the unit will not allow hazardous constituents to migrate beyond the outer layer of the containment system prior to the end of the post-closure care period.

D-6c      Liner System, General Items: 40 CFR 270.21(b)(1), 264.301(a) and (c)

Provide a discussion of the following items that apply to the liner system as a whole.

D-6c(1)      Liner System Description: 40 CFR 270.21(b)(1), 264.301(a) and (c)

Provide a detailed description of the liner system, demonstrating (by description and drawings) that any flow of liquids into and through the liners will be prevented. For each liner within the system (minimum one upper synthetic liner and one bottom composite synthetic/soil liner), describe the type of liner, its material and its material and its thickness. The liner system includes the liner foundation, bottom composite liner, leachate detection system, top synthetic liner, leachate collection system, and any protective layer placed to protect the leachate collection system from damage.

D-6c(2)      Liner System Location Relative to High Water Table: 40 CFR 270.21(b)(1), 264.301(a)(1)(i)

Provide data showing seasonal fluctuations in the depth to the water table and the location of the seasonal high water table in relation to the base of the liner system (i.e., groundwater levels and liner foundation elevations should be shown on geological cross sections).

D-6c(3)      Loads on Liner System: 40 CFR 270.21(b)(1), 264.301(a)(1)(i)

Provide the results of calculations defining the maximum loads or stresses that will be placed on the liner system considering:

- Both static and dynamic loads;
- Stresses due to installation or construction operations;
- Stresses resulting from operating equipment;
- Stresses due to the maximum quantity of waste, cover, and proposed post-closure land use;
- Stresses resulting from settlement, subsidence, or uplift; and
- Internal and external pressure gradients.

D-6c(4)      Liner System Coverage: 270.21(b)(1), 264.301(a)(1)(iii)

Demonstrate that the liner system will be installed to cover all surrounding earth likely to be in contact with the waste or leachate (i.e., construction, as built, or detailed drawings).

D-6c(5)      Liner System Exposure Prevention: 40 CFR 270.21(b)(1), 264.301(a)(1)(i)

Demonstrate that the liner system will not be exposed to wind or sunlight or, if exposure to any part of the system is to be permitted, that such exposure will not result in



unacceptable degradation of that portion of the system (i.e., drawings and/or liner specifications as appropriate). If the liner system will be exposed, provide calculations defining the stresses on the liner system due to thermal expansion and contraction.

D-6d Liner System, Foundation

D-6d(1) Foundation Description: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Describe the foundation for the liner system, including the foundation materials and indicate bearing elevations on geological and construction drawings. Indicate any load bearing embankments placed to support the liner system.

D-6d(2) Subsurface Exploration Data: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

The engineering characteristics of the liner system foundation materials, including subsurface soil, bedrock, and hydrogeologic conditions should be verified through subsurface explorations. These efforts should be fully described by including location plans and cross sections for test borings, test pits, etc., and explanations or references for the procedures used, and may include:

- Historical data;
- Test borings;
- Test pits or trenches;
- In situ tests; and/or
- Geophysical exploration methods.

D-6d(3) Laboratory Testing Data: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Results from sufficient index testing must be provided to classify the site materials. Other lab test data must be provided to evaluate the engineering properties of the foundation materials, particularly for strength, hydraulic conductivity, compressibility, and other important design parameters. Provide copies of the test methods used to test the material or provide references, as appropriate and with any revisions, to standard test procedures.

D-6d(4) Engineering Analyses: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Engineering analyses should be provided that are based on the data gathered through subsurface exploration and laboratory testing program. With the analyses should be a discussion of the methods used, assumptions, copies of calculations, and appropriate references. Included, as appropriate, may be discussion on:

- Settlement potential [item D6d(4)(a);
- Bearing capacity [item D-6d(4)(b);
- Stability of the landfill (cut or constructed) slopes [item D-6d(4)(c);
- Potential for excess hydrostatic or gas pressure [item D-6d(4)(d);
- Seismic conditions;
- Subsidence potential; and

- Sinkhole potential.

D-6d(4)(a) Settlement Potential: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Provide estimates of the total and differential settlement of the liner system foundation, including immediate settlement, primary consolidation and secondary consolidation. When performing the analyses, consider the stresses imposed by the liner system and the applicable stresses computed in item d-6dc(3).

D-6d(4)(b) Bearing Capacity: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Provide an analysis of the allowable bearing capacity of the liner system foundation. Compare the allowable bearing capacity to the required bearing capacity based on the loads imposed by the liner system and the applicable loads computed in item D-6c(3).

D-6d(4)(c) Stability of Landfill Slopes: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Provide, as appropriate, analyses of the stability of:

- Excavated slopes for units or portions of units constructed below grade;
- Embankment slopes for units constructed with earthen dikes or berms to support the liner system or contain the waste; and
- Landfill slopes consisting of the liner system or cover system placed on the waste.

Include in the analyses both static and dynamic cases.

D-6d(4)(d) Potential for Excess Hydrostatic or Gas Pressure: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Provide estimates of the potential for bottom heave or blow-out of the liner system or liner foundation due to unequal hydrostatic or gas pressures.

D-6e Liner System, Liners

D-6e(1) Synthetic Liners: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii), 264.301(c)

For each synthetic liner in the system provide the following general information:

- Thickness;
- Type;
- Material; and
- Brand name and manufacturer.

Provide data for all synthetic liners consideration. Detailed synthetic liner material specifications must also be provided as per item D-6g(1)(a).

D-6e(1)(a) Synthetic Liner Compatibility Data: 40 CFR 270.21(b)(1), 264.301(a)(1)(i)

Provide the results of liner/waste compatibility testing demonstrating that liner strength and performance are still adequate after exposure to waste leachate and to the waste. Both primary and secondary leachate should be used in this testing.

Provide a detailed description of the testing procedure used, or if appropriate reference a standard test method, along with complete test results. Describe how the waste and waste leachate samples were prepared or obtained and demonstrate that they were representative of what the liner will be exposed to within the landfill. Provide a summary and discussion of the test results and conclusions as to the suitability of the synthetic liner.

D-6e(1)(b)     Synthetic Liner Strength: 40 CFR 270.21(b)(1), 264.301(a)(1)(i)

Provide data showing that the synthetic liners have sufficient strength after exposure to the waste and waste leachate to support the loads/stresses as computed in item D-6c(3) (i.e., consider tensile stresses resulting from settlement). Also demonstrate that the liner seams will have sufficient strength.

D-6e(1)(c)     Synthetic Liner Bedding: 40 CFR 270.21(b)(1), 264.301(a)(1)(ii)

Demonstrate that sufficient bedding will be provided above and below the synthetic liners to prevent rupture of the synthetic liner during installation and operation (i.e., thickness and gradation).

Note: The synthetic membrane of a bottom composite liner should be placed directly on the soil portion.

D-6e(2)     Soil Liners: 40 CFR 270.21(b)(1), 264.301(a) and (c)

Provide a description of the soil portion of the bottom composite including its classification, thickness and hydraulic conductivity. The composite bottom liner must consist of at least two components. The composite bottom liner must consist of at least two components. The upper component must be designed and constructed of materials (e.g., geomembrane) to prevent migration of hazardous constituents during the active unit life and post-closure period. The lower component must be constructed of at least 3 feet of compacted soil material. Indicate if the soil liner is in-place material or if borrow material will be used. For in-place soil indicate if the soil will be re-compacted or amended in any way. For borrow material provide a plan showing the location of the borrow area and indicate if the soil will be amended in any way. When analyzing the soil liner assume the synthetic liners have leaked, thus exposing the soil liner to the waste leachate.

Note: The use of in situ soil as the soil liner is permitted only if the situ soil is re-compacted or reworked to provide a hydraulic conductivity of not more than  $1 \times 10^{-7}$  cm/sec. Detailed soil liner material specifications must also be provided as per item D-6g(1)(b).

D-6e(2)(a) Material Testing Data: 40 CFR 270.21(b)(1), 264.301(c)

Provide test results for index tests, laboratory and/or in situ hydraulic conductivity (permeability) tests, strength tests, consolidation tests, and shrink-swell properties of the soil liner material. Provide copies of the test procedures, or if appropriate reference standard test methods, along with complete test results. Discuss the potential for dispersion and piping of the soil due to flow of liquid through the soil liner.

D-6e(2)(b) Soil Liner Compatibility Data: 40 CFR 270.21(b)(1), 264.301(a)(1)(i), 264.301(c)(3)(iii)

Provide the results of permeability testing of the soil liner material using leachate representative of the leachate that the landfill could generate. Discuss the effects, if any, of the leachate on the soil permeability. Provide a copy of the test procedures, or reference appropriate standard test methods, along with a description of how the leachate samples were prepared or obtained, a demonstration that the leachate sample is representative, and the complete test results.

D-6e(2)(c) Soil Liner Strength: 40 CFR 270.21(b)(1), 264.301(a)(1)(i), 264.301(c)(3)(iii)

Demonstrate that the soil liner has sufficient strength to support the loads/stresses computed in item D-6c(3).

Note: Low permeability in some cases is achieved at the expense of adequate strength.

D-6f Liner System, Leachate Collection/Detection Systems: 40 CFR 270.21(b)(1), 264.301(a)(2), 264.301(c)(2), 264.301(c)(3)

The leachate collection system is located above the top synthetic liner in the liner system and the leachate detection system is located between the liners in the liner system. Provide the following information about the leachate collection/detection system. Provide detailed material specifications as per item D-6g(1)(c).

D-6f(1) System Operation and Design: 40 CFR 270.21(b)(1), 264.301(a)(2), 264.301(c)(2), 264.301(c)(3)

Describe the design feature of the leachate collection and removal system and how the system will function to remove collected leachate in a timely manner. Describe the design feature of the leachate detection system and how the system will function to detect any leakage through either liner in a timely manner. Describe how liquid can be removed from the leachate detection system. Describe any protective layer placed over the leachate collection system to protect it from damage caused by the waste placement operations.

D-6f(2) Drainage Material: 40 CFR 270.21(b)(1), 264.301(a)(2), 264.301(c)(3)(ii)

Describe the leachate detection system drainage material. The detection system must be constructed to granular drainage materials with a hydraulic conductivity of  $1 \times 10^{-2}$

cm/sec or more and a thickness of 12 inches or more; or the detection system must be constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^{-5}$  m<sup>2</sup>/sec or more.

- D-6f(3)      Grading and Drainage:    40 CFR 270.21(b)(1), 264.301(a)(2), 264.301(c)(2), 264.301(c)(3)

Indicate the slopes of the leachate collection/detection systems and provide a contour plan for the systems along with a plan showing the layout and spacing of the piping system. For leachate collection and removal systems with slopes of less than 2%, demonstrate that the proposed systems will drain as well as one with a minimum of 2% slopes (i.e., through the use of an alternative design). Demonstrate that the leak detection system (located above the lower-most liner) will be constructed with a bottom slope of 1% or more. Demonstrate that the leachate collection and removal system and the leak detection system are appropriately graded to assure that leachate at any point in the liner system is detected in a timely manner.

Provide complete details of the piping system along with any sumps, pumps, etc. and demonstrate that the pipes and pipe perforations are sized sufficiently to handle the expected flow of leachate. For design of the leak detection system (located between the liners) provide sufficient piping to provide for rapid and timely detection of any leakage. The leak detection system sumps must be separate from the leachate collection system sumps and provide with provisions for measuring the quantity of collected leachate or leakage.

- D-6f(4)      Maximum Leachate Head: 40 CFR 270.21(b)(1), 264.301(a)(2), 264.301(c)(2)

Describe and demonstrate that the design and operating features will prevent the leachate depth over the top of the primary liner from exceeding one foot (i.e., one foot above the uppermost liner). Provide copies of calculations along with a justification of the assumed parameters and of the numerical technique used.

- D-6f(5)      System Compatibility: 40 CFR 270.21(b)(1), 264.301(a)(2)(i)(A), 264.301(c)(3)(iii)

Demonstrate that all components of the leachate collection/detection systems are chemically resistant to the waste managed in the landfill and the leachate expected to be generated.

- D-6f(6)      Systems Strength: 40 CFR 270.21(b)(1), 264.301(a)(2)(i)(B), 264.301(c)(3)(iii)

- D-6f(6)(a)      Stability of Drainage Layers:    40 CFR 270.21(b)(1), 264.301(a)(2)(i)(B), 264.301(c)(3)(iii)

Demonstrate that the drainage layers of the leachate collection/detection system have sufficient strength to support the loads and stresses computed in item D-6c(3) (i.e., sufficient soil bearing capacity to support loads). Demonstrate (by providing calculations) that the drainage layers placed on sloped surfaces of the landfill or foundation will be stable during construction.

- D-6f(6)(b)     Strength of Piping: 40 CFR 270.21(b)(1), 264.301(a)(2)(i)(B), 264.301(c)(3)(iii)
- Demonstrate that the pipe used in the piping system has sufficient strength (crushing or deflection as appropriate) to support the loads computed in item D-6c(3).
- D-6f(7)     Prevention of Clogging: 40 CFR 270.21(b)(1), 264.301(a)(2)(ii), 264.301(c)(3)(iv)
- Demonstrate that the leachate collection/detection systems are designed and operated to prevent clogging (due to piping) of the drainage layer material of the pipes throughout the active life of the landfill. Consideration must also be given to physical, chemical and/or biological clogging. As an alternative, describe how clogging would be detected and what cleanout procedures would be used to restore the capacity of the system. Include calculations demonstrating the effectiveness of the protection material or system.
- D-6f(8)     Liquid Removal: 40 CFR 270.21(b)(1), 264.301(c)(3)(v), 264.301(c)(4)
- Describe the sumps and liquid removal methods (e.g., pumps) of sufficient size to collect and remove liquids from the sump and prevent liquids from backing up into the drainage layer. Each unit must have its own sump. Each sump and removal system must provide a method for measuring and recording the volume of liquids present in the sump and of liquids removed.
- Indicate that the owner/operator will collect and remove pumpable liquids in the sumps to minimize the head on the bottom liner. Indicate the fate of the collected leachate, which is considered a hazardous waste.
- D-6f(9)     Location Relative to Water Table: 40 CFR 270.21(b)(1)(iii), 264.301(c)(5)
- The owner/operator of a leak detection system that is not located completely above the seasonal high water table must demonstrate that the operation of the leak detection system will not be adversely affected by the presence of groundwater.
- D-6g     Liner System, Construction and Maintenance
- D-6g(1)     Material Specifications
- D-6g(1)(a)     Synthetic Liners: 40 CFR 270.21(b)(1), 264.301(a)(1)
- Provide detailed material specifications for the specific synthetic liner or liners to be used.
- D-6g(1)(b)     Soil Liner: 40 CFR 270.21(b)(1), 264.301(a)(1)
- For soil liners constructed of borrow material, provide specifications for the soil material. For soil liners utilizing in-place soil, provide specifications to be used to assure that all existing materials meet the requirements of the liner design. Provide a testing procedure for determining in situ permeability of the soil liner after construction.

Also provide a criteria for approval of the material before placement of additional components of the liner system. For soil liners that use amended soil, provide material specifications for the amendment material. The soil liner material specifications should indicate the maximum particle size (this is very critical if a synthetic liner is to be placed directly on the soil liner) and call for the removal of roots and other unsuitable material.

D-6g(1)(c) Leachate Collection/Detection System: 40 CFR 270.21(b)(1), 264.301(a) and (c)

Provide material specifications for:

- Drainage layer material;
- Filter fabric or filter layer;
- Piping; and
- Sumps.

D-6g(2) Construction Specifications

D-6g(2)(a) Liner System Foundation: 40 CFR 270.21(b)(1), 264.301(a)(1), 264.303(a)

For installed foundations, provide construction specifications of the foundation installation procedures. For units that use the in-place material or the liner system foundation, provide construction specifications for preparation of the liner system foundation.

D-6g(2)(b) Soil Liner: 40 CFR 270.21(b)(1), 264.301(a)(1), 264.303(a)(2)

Describe the procedures for installing the soil liner. Include:

- Method of compaction;
- Degree of compaction and percent moisture content that must be achieved;
- Lift Thickness;
- Methods to be used to alter the water content of the soil;
- Scarification requirement between lifts; and
- If applicable, method of amending the soil.

D-6g(2)(c) Synthetic Liners: 40 CFR 270.21(b)(1), 264.301(a)(1), 264.303(a)(1)

Provide construction specifications for placement of the synthetic liners which include:

- Inspection of the synthetic liner bed for material which could puncture the liner (and removal of that material);
- Placement procedures;
- Techniques to be used to bond the liner seams; and
- Procedures for protection of the liner before and during placement of material on top of the liner.

D-6g(2)(d) Leachate Collection/Detection Systems: 40 CFR 270.21(b)(1), 264.301(a) and (c)

Provide construction specifications for placement of all components of the leachate collection/detection systems, including:

- Drainage layers;
- Piping;
- Sumps, pumps, etc.;
- Filter layers; and
- Any protective layer placed to protect the system during construction or operations.

D-6g(3) Construction Quality Assurance Program: 40 CFR 270.21(b)(1), 270.30(k)(2), 264.19, 264.303(a)

Provide complete details of the Construction Quality Assurance (CQA) Program to be used during construction of the liner system to assure that it is built as designed. Include a description of all testing procedures such as testing of the synthetic liner seams, in situ permeability testing of the soil liner, compaction control for the soil liner, etc. Indicate if the contractor or owner will perform the testing and inspection and indicate the necessary qualifications of the testing and inspection personnel.

The program must be developed and implemented under the direction of a CQA officer who is a registered professional engineer. The CQA Program must:

- Identify all applicable units and provide a description of how they will be constructed;
- Identify key personnel and provide CQA officer qualifications;
- Describe observations, inspections, tests, and measurements sufficient to ensure the structural stability and integrity of all foundations, dikes, low permeability soil liners, geomembranes, leachate collection and removal systems, and leak detection systems;
- Describe observations, inspections, tests, and measurements to ensure proper construction and installation (as appropriate) of liners, leachate collection and removal systems, leak detection systems, and final cover system;
- Describe observations, inspections, tests, and measurements to ensure conformity of all materials used, in accordance with design and other material specifications; and
- Describe test fills for compacted soil liners using same method as in the full scale unit to ensure hydraulic conductivity requirements are met.

Provide a statement that waste shall not be received in the unit until the owner/operator has certified that the CQA program has been successfully carried out and that the unit meets construction requirements.

D-6g(4) Maintenance Procedures for Leachate Collection/Detection System: 40 CFR 270.21(b)(1), 264.301(a) and (c)



Describe the anticipated maintenance activities that will be used to assure proper operation of the leachate collection/detection system throughout the landfill's expected life.

D-6g(5) Liner Repairs During Operations: 40 CFR 270.21(b)(1), 264.301(a)

Describe the methods that will be used to repair any damage to the liner that occurs while the landfill is in operation during placement of the waste (such as a dozer ripping the liner).

D-6h Action Leakage Rate: 40 CFR 270.21(b)(1)(v), 264.302

D-6h(1) Determination of Action Leakage Rate: 40 CFR 270.21(b)(1)(v), 264.302(a)

Identify the action leakage rate for landfill units subject to the liner system provisions of 264.301(c) and 264.301(d). The action leakage rate shall be defined as the maximum design flow rate that the leak detection system (i.e., the leachate collection and removal system) can remove without the fluid head on the bottom liner exceeding 1 foot. The action leakage rate must include an adequate safety margin to allow for uncertainties in the design, construction, operation, and location of the leak detection system, waste and leachate characteristics, sources of other liquids in the system, and proposed response actions.

D-6h(2) Monitoring of Leakage: 40 CFR 270.21(b)(1)(v), 264.302(b)

To determine if the action leakage rate has been exceeded, the owner/operator must convert the required leachate flow rate monitoring data to an average daily flow rate (gallons per acre per day) for each sump. This average daily flow rate (or an alternate calculation, if approved by the Regional Administrator) must be calculated weekly during the active life of the facility and closure period, and monthly during the post-closure care period.

D-6i Leakage Response Action Plan: 40 CFR 270.21(b)(1)(v), 264.304

D-6i(1) Response Actions: 40 CFR 270.21(b)(1)(v), 264.304(a)

Provide a response action plan for landfills subject to the liner system provisions of 264.301(c) or 264.301(d). The response action plan must describe the actions to be taken if flow rate into the leak detection system exceeds the action leakage rate.

D-6i(2) Leak and/or Remedial Determinations: 40 CFR 270.21(b)(1)(v), 264.304(b), 264.304(c)

The response action plan must outline procedures to determine, to the extent practicable, (1) the location, size, and cause of any leak; (2) whether waste receipt should cease or be curtailed; (3) whether waste should be removed from the unit for inspection, repairs, or controls; (4) whether the unit should be closed; and (5) other short-term or long-term actions to be taken to mitigate or stop leaks.

To make leak and/or remediation determinations, the owner/operator must (1) assess the source of the liquids and amounts of liquids by source, (2) conduct a fingerprint, hazardous constituent, or other analyses of the liquids to identify the source and possible location of any leaks and the hazard and mobility of the liquid, and (3) assess the seriousness of any leaks in terms of potential for escaping into the environment. Alternatively, the owner/operator may document why such assessments are not needed.

D-6i(3)      Notifications: 40 CFR 270.21(b)(1)(v), 264.304(b)

The response action plan must indicate that the Regional Administrator will: (1) be notified in writing within seven (7) days of determining that the action leakage rate has been exceeded; (2) be provided with a preliminary assessment and action plan within 14 days of the initial determination that the action leakage rate has been exceeded; and (3) receive a status report within 30 days after the original notification that the action leakage rate has been exceeded. The Regional Administrator must receive monthly status reports for as long as the flow rate exceeds the action leakage rate.

D-6j      Run-on and Run-off Control Systems

D-6j(1)      Run-on Control System: 40 CFR 270.21(b)(2), 264.301(g)

Describe the system that will be used to prevent run-on onto active portions of landfills.

D-6j(1)(a)      Design and Performance: 40 CFR 270.21(b)(2), 264.301(g)

Describe the run-on control system design and how the design prevents run-on from reaching the active portions of the site. Provide a plan view showing the locations of the run-on control system components, along with sufficient drawing details, profiles and cross sections along with the calculations used to size the system.

D-6j(1)(b)      Calculation of Peak Flow: 40 CFR 270.21(b)(1), 264.301(g)

Identify the peak surface water flow expected to result from a 25-year design storm. Describe the data sources and methods used to make the peak flow calculation. Provide copies of the calculations and data, including appropriate references.

D-6j(2)      Run-off Control System: 40 CFR 270.21(b)(3), 264.301(h)

Describe the run-off control system to be used to collect and control run-off from active portions.

D-6j(2)(a)      Design and Performance: 40 CFR 270.21(b)(3), 264.301(h)

Describe the run-off collection and control system design. Provide calculations demonstrating that the system has sufficient capacity to collect and hold the total run-off volume. Provide a plan view showing the locations of the run-off control system components, along with sufficient drawing details and cross sections. Indicate the fate of the collected run-off that is considered hazardous waste until tested and/or treated.

- D-6j(2)(b)      Calculation of Peak Flow: 40 CFR 270.21(b)(3), 264.301(h)
- Identify the total run-off volume expected to result from at least a 24-hour, 25-year storm. Describe data sources and methods used to make the peak flow calculation. Provide copies of the calculations and data, including appropriate references.
- D-6j(3)      Management of Collection and Holding Units: 40 CFR 270.21(b)(4), 264.301(i)
- Describe how collection and holding facilities associated with run-on and run-off control system will be emptied or otherwise managed expeditiously after storms to maintain system design capacity. Describe the fate of liquids discharged from these systems.
- D-6j(4)      Construction: 40 CFR 270.21(b)(2), and (3), 264.301(g) and (h)
- Provide detailed construction and material specifications for run-on and run-off control systems. Include descriptions of the construction quality control program that will be used to assure construction is in accordance with design requirements.
- D-6j(5)      Maintenance: 40 CFR 270.21(b)(2), and (3), 264.301(g) and (h)
- Describe any maintenance activities required to assure continued proper operations of the run-on and run-off control system throughout the active life of the unit.
- D-6k      Control of Wind Dispersal: 40 CFR 270.21(b)(5), 264.301(j)
- If the landfill contains any particulate matter that may be subject to wind dispersal, describe how the landfill is covered or otherwise managed to control wind dispersal.
- D-6l      Liquids in Landfills
- D-6l(1)      Bulk or Noncontainerized Free Liquids: 40 CFR 270.21(h), 264.314
- Describe the procedures that will be used to ensure that no bulk or noncontainerized liquid hazardous waste or waste with free liquids will be placed in the landfill. Describe the processes used to stabilize liquids before placement in the landfill (Note: The use of materials that act only as sorbents is prohibited). Effective November 8, 1985, demonstrate that no free liquids including nonhazardous liquids, will be placed in the landfill unless it can be demonstrated that placement in the landfill is the only reasonably available alternative to disposal in other landfills or unlined surface impoundments and the placement of the liquids will not present a risk of contamination of any underground source of drinking water (Note: The use of the paint filter test, Method 9095, is required in order to demonstrate the absence of free liquids in a stabilized waste).
- D-6l(2)      Containers Holding Free Liquids: 40 CFR 270.21(h), 264.314(d)
- For facilities that intend to dispose of containers holding free liquids, describe how the free liquids will be removed from the containers or stabilized within the container before

the container is placed in the landfill. If the liquid is removed, the container must be backfilled or crushed as discussed in checklist Section D-6m below.

D-6l(3) Restriction to Small Containers: 40 CFR 270.21(h), 264.314(d)(2)

If small containers are to be disposed of in a landfill, demonstrate (by including the container volume) that the containers will be very small (such as ampules).

D-6l(4) Nonstorage Containers: 40 CFR 270.21(h), 264.314(d)(3)

If nonstorage containers are to be disposed of in a landfill, demonstrate (by describing the containers) that the containers are designed to hold free liquids for use other than storage (e.g., batteries, capacitors).

D-6l(5) Lab Packs: 40 CFR 270.21(h), 264.314(d)(4)

Describe how it will be assured that lab packs to be landfilled containing free liquids meet the following requirements.

D-6l(5)(a) Inside Containers: 40 CFR 270.21(h), 264.314(d)(4), 264.316(a)

Demonstrate how it will be assured that inside containers:

- Are securely sealed and not leaking;
- Will not react with, be decomposed by, or ignited by the waste; and
- Meet DOT specifications.

D-6l(5)(b) Overpack: 40 CFR 270.21(h), 264.314(d)(4), 264.316(b)

Demonstrate that overpacking consists of:

- Metal, DOT containers, with open heads no larger than 110 gallons; and
- Sufficient sorbent material determined to be non-biodegradable to completely sorb all of the liquid contents of the inside container.

D-6l(5)(c) Sorbent Materials: 40 CFR 270.21(h), 264.314(d)(4), 264.314(e), 264.316(c)

Demonstrate that the sorbent materials used are not capable of reacting dangerously with, being decomposed by, or being ignited by the contents of the inside containers. Sorbents used to treat free liquids to be disposed of in landfills must be nonbiodegradable. Demonstrate that the material is non-biodegradable using ASTM Method G21-70 (1984a) Standard Practice for Determining Resistance of Synthetic Polymer Materials to Fungi; or ASTM Method G22-76 (1984b) Standard Practice for Determining Resistance of Plastics to Bacteria.

D-6l(5)(d) Incompatible Wastes: 40 CFR 270.21(h), 264.314(d)(4), 264.316(d)

Demonstrate that incompatible wastes will not be placed in the same outside containers.

- D-6l(5)(e)      Reactive Wastes: 40 CFR 270.21(h), 264.314(d)(4), 264.316(e)
- Demonstrate how reactive wastes, other than cyanide-bearing and sulfide-bearing wastes, will be treated or rendered nonreactive prior to packaging.
- D-6m            Containerized Wastes: 40 CFR 270.21(i), 264.315
- If containerized solid wastes are to be landfilled, describe how either: it will be assured that all containers are at least 90% full when placed in the landfill, or containers will be crushed, shredded or similarly reduced in volume to the maximum practical extent before burial.
- D-6n            Special Waste Management Plan for Landfills Containing Wastes F020, F021, F022, F023, F026 and F027: 40 CFR 270.21(j), 264.317
- Provide a plan describing how landfill units containing wastes F020, F021, F022, F023, F026, and F027 are or will be designed, constructed, operated, and maintained in order to protect human health and the environment. The plan must address the following factors.
- D-6n(1)        Wastes Description: 40 CFR 270.21(j)(1), 264.317(a)(1)
- Identify the volume, physical, and chemical characteristics of the wastes including their potential to migrate through the soil or volatilize or escape into the atmosphere.
- D-6n(2)        Soil Description: 40 CFR 270.21(j)(2), 264.317(a)(2)
- Describe the attenuative properties of underlying and surrounding soils or other materials.
- D-6n(3)        Mobilizing Properties: 40 CFR 270.21(j)(3), 264.317(a)(3)
- Describe the mobilizing properties of other materials co-disposed with these wastes.
- D-7              Land Treatment: 40 CFR 270.20, 264.270 through 264.283
- D-7a            Treatment Demonstration: 40 CFR 270.20(a), 264.272
- Demonstrate that hazardous constituents in the waste will be completely degraded, transformed or immobilized in the treatment zone of the unit for which a permit is sought or provide plans for conducting such a demonstration. The demonstration may include field tests, laboratory tests, waste toxicity screening, and, in the case of existing units, operating data.
- D-7a(1)        Demonstration Wastes: 40 CFR 270.20(a)(1), 264.272(a), 264.272(c)(1)(i)

Describe the wastes used in the demonstration and the wastes to be treated during normal operation. Identify the concentrations of all hazardous constituents reasonably expected to be present in both wastes.

D-7a(2)      Demonstration Data Sources: 40 CFR 270.20(a)(2), 264.272(b)

Describe the source of the data used for the treatment demonstration and provide available determinations.

D-7a(2)(a)      Existing Literature: 40 CFR 270.20(a)(2), 264.272(b)

If existing literature is used to demonstrate treatment, submit a brief written review of scientific literature and previous studies that contain pertinent information. Information sources should be properly referenced. In general, existing literature will not be acceptable as a demonstration unless it can be shown that the site and waste characteristics are identical to those in the literature.

D-7a(2)(b)      Operating Data: 40 CFR 270.20(a)(2), 264.272(b)

Provide any operating data gathered from the units to be permitted, including application rate data and operating records. Provide the sampling and analysis methods used and the results obtained that provide analytical confirmation of the extent of waste degradation, transformation and immobilization, as appropriate. When using operating data in the demonstration, indicate that the unit operations will not be different than those used in obtaining the data.

D-7a(3)      Laboratory/Field Testing Program: 40 CFR 270.20(a)(3), 264.272(b) and (c)

Field and laboratory tests to be used for demonstration must be thoroughly described. The characteristics of the units used to gather the demonstration data must be compared to those of the units to be permitted. Include interpretive discussion as appropriate.

D-7a(3)(a)      Toxicity Testing: 40 CFR 270.20(a)(2), 264.272(b)

Describe the acute toxicity test procedures used to estimate the impact of waste application or waste constituents on the soil biota responsible for waste treatment.

D-7a(3)(b)      Field Plot Testing: 40 CFR 270.20(a)(2) and (3), 264.272(b) and (c)

Describe the field plot studies used to demonstrate the treatability of the waste(s) or waste constituents, including:

- The design and operating characteristics of the demonstration unit;
- Horizontal and vertical dimensions of the treatment zone;
- The unsaturated zone monitoring program used in the demonstration;
- Documentation that the demonstration will accurately simulate the waste characteristics, climate, topography, soil characteristics and operating practices at the proposed unit;

- A description of the measures to ensure the protection of human health and the environment including the potential for the migration of hazardous constituents to groundwater or surface water; and
- The demonstration duration and schedule.

D-7a(3)(c) Laboratory Testing: 40 CFR 270.20(b)(2) and (3), 264.272(b) and (c)

Describe the laboratory test methods used to demonstrate the treatability of the waste(s) or waste constituents, including:

- Experiment design and test protocol;
- Materials and methods employed;
- Methods for data reduction and interpretation;
- Documentation that the laboratory testing will accurately simulate the characteristics and operating procedures of the proposed unit;
- A description of the procedures to protect human health; and
- Clean-up activities to be used at test completion.

D-7b Land Treatment Program: 40 CFR 270.20(b), 264.271

Describe the characteristics and operating conditions of the land treatment unit(s) to be permitted.

D-7b(1) List of Wastes: 40 CFR 270.20(b)(1), 264.271(b)

Provide a list of all wastes and their hazardous constituents that will be transformed, immobilized or degraded in the treatment zone.

D-7b(2) Operating Procedures: 40 CFR 270.20(b)(2), 264.273(a)

Describe the operating procedures used to assure uniform and complete degradation, transformation and immobilization.

D-7b(2)(a) Waste Application Rates: 40 CFR 270.20(b)(2)(i), 264.273(a)(1)

Submit information establishing the constituents in the wastes that limit the amount of waste applied at one time, the rate at which reapplication is conducted, and the total capacity of each unit. Identify the rate and frequency of waste application and the concentration of the limiting constituents in the waste.

D-7b(2)(b) Waste Application Methods: 40 CFR 270.20(b)(2)(i), 264.273(a)(1)

Describe the method(s) used to apply and incorporate the waste into the treatment zone.

D-7b(2)(c) Control of Soil pH: 40 CFR 270.20(b)(2)(ii), 264.273(a)(2)

Identify acceptable limits of soil pH and describe the rationale for those limits. Describe how soil pH will be measured and adjusted, including a schedule for the same.

- D-7b(2)(d) Enhancement of Microbial or Chemical Reactions: 40 CFR 270.20(b)(2)(iii), 264.272(a)(3)
- Describe measures used to enhance treatment, including the method and frequency of such measures (e. g., fertilization, microbial inoculations, soil aeration).
- D-7b(2)(e) Control of Soil Moisture: 40 CFR 270.20(b)(2)(iv), 264.272(a)(4)
- Identify the limits on soil moisture content. Describe how soil moisture will be monitored and adjusted, if necessary.
- D-7c Unsaturated Zone Monitoring Plan: 40 CFR 270.20(b)(3), 264.278
- Submit an Unsaturated Zone Monitoring Plan describing the measures used to determine if hazardous wastes have migrated out of the treatment zone.
- D-7c(1) Soil-Pore Liquid Monitoring: 40 CFR 270.20(b)(3), 264.278
- Describe the program for sampling and analysis of soil-pore liquid to detect the migration of dissolved constituents below the treatment zone.
- D-7c(1)(a) Sampling Location: 40 CFR 270.20(b)(3)(ii), 264.278(b) and (d)
- Identify sampling locations, if known, and provide the rationale used to select locations. Demonstrate that the sampling locations provide the capacity to detect migration of hazardous constituents out of the treatment zone. Indicate that the samples will be collected from immediately below the treatment zone.
- D-7c(1)(b) Sampling Frequency: 40 CFR 270.20(b)(3)(i), 264.278(e)
- Provide a schedule for sampling soil-pore liquid. Demonstrate that the proposed frequency is adequate, considering potential migration rates of hazardous constituents out of the treatment zone.
- D-7c(1)(c) Sampling Equipment: 40 CFR 270.20(b)(3)(i), 264.278(e)
- Identify and describe equipment used to obtain soil-pore liquid samples.
- D-7c(1)(d) Sampling Equipment Installation: 40 CFR 270.20(b)(3)(i), 264.278(e)
- Describe the procedures used to install soil-pore liquid monitoring devices.
- D-7c(1)(e) Sampling Procedures: 40 CFR 270.20(b)(3)(i), 264.278(e)(1) and (2)
- Describe soil-pore liquid sampling procedures including methods for sample preparation, preservation and transport.
- D-7c(1)(f) Analytical Procedures: 40 CFR 270.20(b)(3)(iii), 264.278(e)(3)



Identify the analytical methods used to determine the concentration of hazardous constituents in soil-pore liquid samples.

D-7c(1)(g) Chain-of-Custody: 40 CFR 270.20(b)(3)(iv), 264.278(e)(4)

Provide a description of the methods to be used to assure sample integrity throughout sampling, transportation, analysis and reporting.

D-7c(1)(h) Background Values: 40 CFR 270.20(b)(3)(v), 264.278(c)

Describe the sampling and analytical program used to establish background soil-pore liquid concentrations of hazardous constituents. Identify sampling locations and depths, verifying that the area used is representative of the active site soil conditions. Specify the frequency of background sampling. Indicate that background values will be expressed in a form that will permit comparison with on-site values. Provide background data, if available.

D-7c(1)(i) Statistical Methods: 40 CFR 270.20(b)(3)(v), 264.278(f)

Describe the statistical methods that will be used to determine if significant differences exist between background and treatment zone concentrations of hazardous constituents in soil-pore liquids.

D-7c(1)(j) Justification of Principle Hazardous Constituents: 40 CFR 270.20(b)(3)(vii), 264.278(a)(2)

Provide a suggested list of 40 CFR 261 Appendix VIII hazardous constituents to be monitored for in soil-pore liquids. Demonstrate that the selected principal hazardous constituents are more difficult to treat than all other Appendix VIII constituents present in the waste.

D-7c(2) Soil Core Monitoring: 40 CFR 270.20(b)(3), 264.278

Describe the program for monitoring soil cores to detect the migration of hazardous constituents below the treatment zone.

D-7c(2)(a) Sampling Location: 40 CFR 270.20(b)(3)(ii), 264.278(b) and (d)

Identify sampling locations, if known, and provide the rationale used to select locations. Demonstrate that the sampling locations provide the capability to detect migration of hazardous constituents out of the treatment zone. Indicate that soil cores will be collected from immediately below the treatment zone.

D-7c(2)(b) Sampling Frequency: 40 CFR 270.20(b)(3)(i), 264.278(e)

Provide a schedule for sampling soils. Demonstrate that the proposed frequency is adequate, considering potential migration rates of hazardous constituents out of the treatment zone.

- D-7c(2)(c)     Sampling Equipment: 40 CFR 270.20(b)(3)(i), 264.278(e)  
Identify and describe equipment used to sample soil cores.
- D-7c(2)(d)     Sampling Procedures: 40 CFR 270.20(b)(3)(i), 264.278(e)(1) and (2)  
Describe soil core sampling procedures including methods for sample preparation, preservation and transport.
- D-7c(2)(e)     Analytical Procedures: 40 CFR 270.20(b)(3)(iii), 264.278(e)(3)  
Identify the analytical methods used to determine the concentration of hazardous constituents in soil core samples.
- D-7c(2)(f)     Chain-of-Custody: 40 CFR 270.20(b)(3)(iv), 264.278(e)(4)  
Provide a description of methods to be used to assure sample integrity throughout sampling, transportation, analysis and reporting.
- D-7c(2)(g)     Background Values: 40 CFR 270.20(b)(3)(v), 264.278(c)  
Describe the sampling and analytical program used to establish background soil core concentrations of hazardous constituents. Identify sampling locations and depths, verifying that the area used is representative of the active site soil conditions. Specify the frequency of background sampling. Indicate that background values will be expressed in a form that will permit their comparison with on-site values. Provide background data, if available.
- D-7c(2)(h)     Statistical Methods: 40 CFR 270.20(b)(3)(vi), 264.278(f)  
Describe the statistical methods that will be used to determine if significant differences exist between background and treatment zone concentrations of hazardous constituents in soil core samples.
- D-7c(2)(i)     Justification of Principal Hazardous Constituents: 40 CFR 270.20(b)(3)(vii), 264.278(a)(2)  
Provide a suggested list of 40 CFR 261 Appendix VIII hazardous constituents to be monitored for in soil core samples. Demonstrate that the selected principal hazardous constituents are more difficult to treat than all other Appendix VIII constituents present in the waste.
- D-7d             Treatment Zone Description: 40 CFR 270.20(b)(5), 264.271(c)  
Identify the dimensions of the treatment zone and the soil(s) within the treatment zone.
- D-7d(1)         Horizontal and Vertical Dimensions: 40 CFR 270.20(b)(5), 264.271(c)

Identify the horizontal and vertical dimensions of the treatment zone.

D-7d(2) Soil Survey: 40 CFR 270.20(b)(2), 264.272(c)(1)(iv)

Provide a map or plot plan delineating the horizontal boundaries of the treatment zone and all soil series occurring within the treatment zone.

D-7d(3) Soil Series Descriptions: 40 CFR 270.20(b)(2), 264.272(c)(1)(iv)

Submit a description of each soil series identified within the treatment zone, including the following: profile description with horizonation, depth, color, USDA texture, structure, thickness, slope, mineralogy, use and vegetation, Atterburg limits, water capacity, shrink-swell potential, erosion factors, and salinity.

D-7d(4) Soil Sampling Data: 40 CFR 270.20(b)(2), 264.272(c)(1)(iv)

Provide the results of soil analyses for each treatment zone soil series.

D-7d(5) Seasonal High Water Tables: 40 CFR 264.271(c)(2)

Identify the depth to the seasonal high water table and the source of the data.

D-7e Unit Design, Construction, Operation, and Maintenance: 40 CFR 270.20(c), 264.273

Describe the design, construction, operation, and maintenance of run-on, run-off and wind dispersal controls.

D-7e(1) Run-On-Control: 40 CFR 270.20(c)(1), 264.273(c)

Submit a scale drawing of the unit showing any run-on controls used. Demonstrate that those controls will prevent flow onto the treatment zone from at least a 25-year storm.

D-7e(2) Run-Off Control: 40 CFR 270.20(c)(1), 264.273(c)

Describe the run-off collection and control system and demonstrate that it is capable of managing the peak flow resulting from a 24-hour, 25-year storm.

D-7e(3) Minimizing Hazardous Constituents Run-Off: 40 CFR 270.20(c)(3), 264.273(b)

Identify specific measures that will minimize the concentration of hazardous constituents in run-off from the unit.

D-7e(4) Management of Accumulated Run-On and Run-Off: 40 CFR 270.20(c)(4), 264.273(e)

Demonstrate that collection and holding facilities associated with run-on and run-off control systems will be managed after storms to maintain the minimum required design capacity of the system. Describe the fate of collected surface water including sampling and analysis protocols for determining contaminant levels.

- D-7e(5)      Control of Wind Dispersal: 40 CFR 270.20(c)(6), 264.273(f)
- Describe methods employed to control wind dispersal of particulate matter from the treatment zone.
- D-7f      Food Chain Crops: 40 CFR 270.20(d), 264.276
- Demonstrate that there is no substantial risk to human health or the environment caused by the growth of the food chain crops on the unit.
- D-7f(1)      Food Chain Crop Demonstration: 40 CFR 270.20(d), 264.276(a)(1)
- For all hazardous constituents, except cadmium, demonstrate that:
- Hazardous constituents will not be transferred to the food or feed portions of the crop nor ingested by food chain animals; or
  - Will not occur in food or feed chain crops in concentrations above background levels.
- D-7f(1)(a)      Demonstration Basis: 40 CFR 270.20(d)(1) and (2), 264.276(a)(3)(i)
- Show that the demonstration results will be representative of the unit to be permitted, considering:
- Soil characteristics;
  - Waste characteristics;
  - Application rates and methods;
  - Crop characteristics; and
  - Climate effects.
- D-7f(1)(b)      Test Procedures: 40 CFR 270.20(d)(3), 264.276(a)(3)(ii)
- Describe the procedures used in any tests referenced or conducted. Include sample selection criteria, sample size, analytical methods, and statistical procedures.
- D-7f(2)      Cadmium-Bearing Wastes: 40 CFR 270.20(e), 264.276(b)
- If cadmium is present in the waste to be land treated, provide the information specified in either D-7f(2)(a) or D-7f(2)(b).
- D-7f(2)(a)      Crops for Human Consumption: 40 CFR 270.20(e), 264.276(b)(1)
- If crops are to be grown for human consumption, provide the following data:
- Soil pH;
  - Soil pH controls;
  - Cadmium loading rate; and
  - Soil cation exchange capacity.

- D-7f(2)(b)     Animal Feed: 40 CFR 270.20(e), 264.276(b)(2)
- If only animal feed is to be grown, provide the soil pH and soil pH controls. Provide a copy of an operating plan demonstrating how animal feed will be distributed to preclude ingestion by humans, including control of alternative land use.
- D-7g     Special Waste Management Plan for Land Treatment Units Containing Wastes F020, F021, F022, F023, F026, and F027: 40 CFR 264.283, 270.20(i)
- Provide a plan describing how land treatment units containing wastes F020, F021, F022, F023, F026, and F027 are or will be designed, constructed, operated and maintained in order to protect human health and the environment. The plan must address the following factors:
- D-7g(1)     Waste Description: 40 CFR 264.283(a)(1), 270.20(i)(1)
- Identify the volume, physical, and chemical characteristics of the wastes including their potential to migrate through the soil or volatilize or escape into the atmosphere.
- D-7g(2)     Soil Description: 40 CFR 264.283(a)(2), 270.20(i)(2)
- Describe the attenuative properties of underlying and surrounding soils or other materials.
- D-7g(3)     Mobilizing Properties: 40 CFR 264.283(a)(3), 270.20(i)(3)
- Describe the mobilizing properties of other materials co-disposed with these wastes.
- D-7g(4)     Additional Management Techniques: 40 CFR 264.283(a)(4), 270.20(i)(4)
- Document the effectiveness of additional treatment, design, operating, or monitoring techniques in reducing the migratory potential of these wastes to groundwater, surface water, or air.
- D-7h     Incompatible Wastes: 40 CFR 270.20(h), 264.282
- Indicate that incompatible wastes will not be placed in or on the same treatment zone unless Section 264.17(b) is complied with.
- D-8     Miscellaneous Units: 40 CFR 264.601, 270.23
- Identify all miscellaneous units that treat, store or dispose of hazardous waste at the facility, but do not fit the current definition of container, tank, surface impoundment, waste pile, land treatment unit, landfill, incinerator, boiler, industrial furnace or underground injection well. A miscellaneous unit may include (but is not limited to) any of the following:

- Geologic repositories other than injection wells (such as underground salt formations, mines, or caves, either for the purpose of disposal or long-term retrievable storage);
- Deactivated missile silos, other than injection wells or tanks;
- Thermal treatment units other than incinerators, boilers, or industrial furnaces (such as combustion and noncombustion units such as molten salt pyrolysis, calcination, wet-air oxidation, and microwave destruction);
- Units open burning and open detonating (OB/OD) explosive wastes;
- Certain chemical/physical/biological treatment units; and
- Mobile units using technologies that are covered under other subparts of Part 264, such as incineration or treatment in containers, are excluded from this section. However, those units listed above that are mobile, are covered.

Examples of units not defined as miscellaneous units include:

- Treatment, storage, disposal in units currently regulated under Part 264;
- Open burning of nonexplosive hazardous waste;
- Units excluded from permitting under Parts 264 and 270 (such as POTW and ocean disposal activities);
- Placement of hazardous waste underground that is regulated under Part 146 (UIC program); and
- RD&D units covered under 270.65.

D-8a Description of Miscellaneous Units: 40 CFR 270.23(a)

Provide a detailed description of the unit. Include the physical characteristics, materials of construction and dimensions of the unit. Provide the detailed plans and engineering reports that describe how the unit will be located, designed, constructed, operated, maintained, monitored, and inspected. Include also a detailed process description. Provide information on specific design and operating standards that mitigate site-specific risks such as potential releases or potential reactions among wastes or between wastes and containment structures.

D-8b Waste Characterization: 40 CFR 264.601(a)(1), 264.601(b)(1), 264.601(c)(1)

Provide information on the volume and concentration of the waste in order to determine release potential. Provide the physical and chemical characteristics of the waste in order to determine (1) the toxicity of the waste; (2) the ability of the waste to be contained, immobilized, degraded or attenuated or to migrate in various soils and materials; (3) the probability of reactions taking place among wastes or between wastes and liners or other containment structures; and (4) the potential of the waste to react or evaporate to form gaseous, aerosol, or particulate products that enter the atmosphere.

D-8c Treatment Effectiveness: 40 CFR 270.23(d)

For each treatment unit, a report must be submitted demonstrating the effectiveness of the treatment based on laboratory, bench scale, pilot scale, or field data.

Environmental Performance Standards for Miscellaneous Units

Environmental performance standards must be established and maintained to protect human health and the environment. For each media of concern (groundwater and subsurface environment; surface water, wetlands, and soil surface; air), performance standards must be based on the following information and assessments:

- Assessment of the potential pathways of exposure of humans and environmental receptors to hazardous waste or hazardous constituents and the potential magnitude and nature of such exposures;
- Evaluation of how the migration of waste constituents in the media is prevented; and
- Information on the type of waste managed, types of technologies, types and quantities of emissions or releases, and extent of migration or dispersion of the media in various media.

For guidance on conducting an exposure assessment refer to the September 24, 1986 Federal Register notice "Guidance for Exposure Assessments" and the "RCRA Facility Investigation (RFI) Guidance, Vol I," Section 8, Health and Environment Assessment.

D-8d(1) Protection of Groundwater and Subsurface Environment: 40 CFR 264.601(a), 270.23(b) and (c)

D-8d(1)(a) Environment Assessment: 40 CFR 264.601(a), 270.23(b) and (c)

The applicant must conduct an assessment of the potential for release to groundwater or the subsurface environment. Both the saturated and unsaturated zones must be considered in evaluating the potential for subsurface migration. This assessment must consider the following factors:

- Waste characteristics and volume, including potential for migration through soils, liners, or other containing structures (264.601(a)(1));
- Hydrologic and geologic characteristics of the unit and surrounding area (264.601(a)(2));
- Existing groundwater quality, including other sources of contamination and their cumulative impact on the groundwater (264.601(a)(3));
- Quantity and direction of groundwater flow (264.601(a)(4));
- Proximity to and withdrawal rates of current and potential groundwater users (264.601(a)(5));
- Regional land use patterns (264.601(a)(6));
- Potential for deposition or migration of waste constituents into subsurface physical structures and the root zone of vegetation (264.601(a)(7));
- Potential for human health risks caused by exposure to waste constituents (264.601(a)(8));
- Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents (264.601(a)(9)); and

- Potential magnitude and nature of exposure of humans or environmental receptors to hazardous waste or hazardous constituents (270.23(c)).

D-8d(1)(b) Performance Standards: 40 CFR 264.601, 270.23(b)

Based on the assessments, performance standards must be developed and maintained. These must include: (1) design and operating requirements; (2) detection and monitoring requirements of 264.602; and (3) requirements for response to release of hazardous waste or hazardous constituents from the unit. Performance standards may include appropriate standards from Part 264 Subparts I through O, Part 270, and Part 146.

D-8d(2) Protection of Surface Water, Wetlands, and Soil Surface: 40 CFR 264.601(b), 270.23(b) and (c)

D-8d(2)(a) Environmental Assessment: 40 CFR 264.601, 270.23(b) and (c)

The applicant must conduct an assessment of the potential for release to surface water, wetlands, or soil surface. This assessment must consider the following factors:

- Waste characteristics and volume (264.601(b)(1));
- Effectiveness and reliability of containing, confining, and collecting systems and structures in preventing migration (264.601(b)(2));
- Hydrologic characteristics of the unit and the surrounding area (264.601(b)(3));
- Topography of the surrounding area and hydrologic unit characteristics (264.601(b)(3));
- Regional precipitation patterns (264.601(b)(4));
- Quantity, quality, and direction of groundwater flow (264.601(b)(5));
- Proximity of the unit to surface waters (264.601(b)(6));
- Current and potential uses of nearby surface waters (264.601(b)(7));
- Established water quality standards for surface waters (264.601(b)(7));
- Existing quality of surface waters and surface soils, including other sources of contamination and their cumulative impact on surface waters and surface soils (264.601(b)(8));
- Regional land use patterns (264.601(b)(9));
- Potential for human health risks caused by exposure to waste constituents (264.601(b)(10));
- Potential for damage to domestic animals, wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents (264.602(b)(11));
- Meteorologic assessment (270.23(b)); and
- Potential magnitude and nature of exposures of humans or environmental receptors to hazardous wastes constituents (270.23(c)).

D-8d(2)(b) Performance Standards: 40 CFR 264.601

Based on the assessments, performance standards must be developed and maintained. These must include (1) design and operating requirements (structures that should be considered include liners, dikes, diversion ditches, and cut-off walls); (2) detection and



monitoring requirements of 264.602; and (3) requirements for responses to releases of hazardous waste or hazardous constituents from the unit.

Performance standards may include appropriate standards from Part 264 Subparts I through O, Part 270, and Part 146.

D-8d(3)      Protection of the Atmosphere: 40 CFR 264.601(c), 270.23(b) and (c)

D-8d(3)(a)      Environmental Assessment: 40 CFR 264.601(c), 270.23(b) and (c)

The applicant must conduct an assessment of the potential for release to the air. This assessment must consider the following factors:

- Waste characteristics and volume, including potential for emission and dispersal of gases, aerosols, and particulates (264.601(c)(1));
- Effectiveness and reliability of systems and structures to reduce or prevent emissions (264.601(c)(2));
- Operating characteristics of the unit (may include restrictions of operations during certain weather conditions) (264.601(c)(3));
- Atmospheric, meteorologic, and topographic characteristics of the unit and the surrounding area (should include wind rose, frequency of inversions, evaporation rates, annual and 24-hour rainfall data, and seasonal temperatures) (264.601(c)(4));
- Existing air quality, including other sources of contamination and their cumulative impact on the air (264.601(c)(5));
- Potential for human health risks caused by exposure to waste constituents (264.601(c)(6));
- Potential for damage to domestic animals, wildlife, crops, vegetation and, physical structures caused by exposure to waste constituents (264.601(c)(7)); and
- Potential magnitude and nature of exposure of humans or environmental receptors to hazardous waste or hazardous constituents (270.23(c)).

A recommended air pathway assessment methodology includes the following steps:

- Obtain source characterization information;
- Select release constituents;
- Calculate emission estimates;
- Calculate concentration estimates at unit boundary using standard dispersion models;
- Compare concentration results to health-based criteria in RFI Guidance, Vol I, Section 8; and
- Conduct monitoring to confirm results.

D-8d(3)(b)      Performance Standards: 40 CFR 264.601

Based on the assessments, performance standards must be developed and maintained. These must include: (1) design and operating requirements; (2) detection and

monitoring requirements of 264.602; and (3) requirements of responses to releases of hazardous waste or hazardous constituents from the unit.

Performance standards may include appropriate standards from Part 264 Subparts I through O, Part 270, and Part 146.

D-8e Monitoring, Analysis, Inspection, Response, Reporting, and Corrective Action: 40 CFR 264.602

D-8e(1) Elements of a Monitoring Program: 40 CFR 264.602

A monitoring program must include procedures for sampling, analysis, and evaluation of data, suitable response procedures, and a regular inspection schedule. The following elements must be included:

- Location of monitors;
- Constituents to be monitored and frequency of monitoring;
- Procedures to maintain integrity of monitoring devices;
- Sample collection and preservation;
- Analytical methods;
- Applicable procedures for evaluation of data; and
- Appropriate response procedures.

D-8e(2) Air Monitoring Alternatives: 40 CFR 264.602

For situations in which ambient air monitoring would be unsafe or impractical, possible alternatives may include analysis of waste, emission measurements, and periodic monitoring with portable detectors. Describe in detail any alternatives proposed to meet the air monitoring requirements.

D-9 Boilers and Industrial Furnaces (BIFs)

D-9a Waivers/Exemptions: 40 CFR 270.22(a)(2)(i), 266.104(a)(4), 266.110

If applying for a waiver or exemption, provide information demonstrating compliance with the requirements outlined below:

D-9a(1) Waiver of DRE Trial Burn for Boilers: 40 CFR 270.22(a)(2)(i), 266.104(a)(4), 266.110

A boiler that is not burning hazardous waste containing F020, F021, F022, F023, F026, and F027 and submits documentation that it operates under the following conditions is considered in compliance with 266.104(a) DRE Standard, and a DRE trial burn is waived:

- A minimum of 50% fuel fired to the boiler is fossil fuel, fuels derived from fossil fuels, tall oil, or other non-hazardous fuel with fossil fuel characteristics (with the Director's approval), with the firing rate determined on a total heat or

mass input basis, whichever results in the greater mass feed rate of primary fuel fired.

- Boiler load is not less than 40%.
- Primary and hazardous waste fuels have a minimum as-fired heating value of 8,000 BTU/lb.
- The device operates in conformance with the carbon-monoxide standard of 266.104(b)(1).
- The boiler is a nonstoker watertube boiler.
- The hazardous waste is fired directly into the primary fuel flame zone under the conditions specified in 266.110(f).

D-9a(2) Low Risk Waste Exemption: 40 CFR 270.22(a)(2)(ii), 266.104(a)(5), 266.109(a)

The DRE Standard for a BIF may be waived provided the following information is documented and submitted:

- A minimum of 50% of the fuel fired to the device is fossil fuel, fuels derived from fossil fuels, tall oil, or other non-hazardous fuel with fossil fuel characteristics (with the Director's approval), with the firing rate determined on total heat or mass input basis, whichever results in the greater mass feed rate of primary fuel fired.
- Primary and hazardous waste fuels have a minimum of 8,000 BTU/lb as fired heating value.
- The hazardous waste is fired directly into the fuel flame zone.
- The device operates in accordance with carbon monoxide controls provided by 266.104(b)(1).
- Hazardous waste burning will not pose unacceptable, adverse public health effects, as demonstrated in accordance with 266.109(a)(2).
  - For each waste to be burned, identify and quantify concentrations of Appendix VIII non-metal constituents, except for those that would not reasonably be expected to be in the waste, explaining the basis for excluding any such non-metals.
  - Hazardous waste firing rate of each constituent identified above.
  - Calculations of reasonable worst-case emission rates of each constituent identified above, based on 99.9% DRE.
  - Results of emissions dispersion modeling for each Appendix VIII constituent identified above for all stacks (if multiple stacks).
  - Documentation that the maximum annual average ground level concentration of each constituent identified above does not exceed the allowable level established in Appendices IV or V of Part 266 (carcinogens must be summed).

D-9a(3) Waiver of Particulate Matter Standard: 40 CFR 266.109(b), 270.22(a)(4)

The particulate matter standard of 266.105 and trial burn for particulate matter may be waived if:

- The BIF complies with Tier I or Adjusted Tier I metals feed rate screening limits under 266.106(b) or (e) and submits documentation showing conformance with the trial burn waiver under checklist Section D-9a(4) below.
- The BIF meets the requirements of the low risk waste exemption under checklist Section D-9a(2) above.

D-9a(4) Waiver of Trial Burn for Metals: 40 CFR 266.106(b), 266.106(e), 270.22(a)(3)

A trial burn is not required to demonstrate conformance with the metals standards if the BIF is operated under Tier I or adjusted Tier I metals feed rate screening limits and the following documentation is submitted:

- Feed rate of hazardous waste, other fuels, and industrial furnace feed stocks.
- Concentrations of each of the 10 toxic metals in the hazardous waste, other fuels, and industrial furnace feed stocks.
- Calculation of the total feed rate of each metal.
- Documentation showing how the applicant will ensure the Tier I or Adjusted Tier I feed rate screening limits will not be exceeded during the averaging period under 266.106(b) or (e). (See also checklist Sections C-1h and C-2g.)
- Determination of the following:
  - Terrain-adjusted effective stack height.
  - Good engineering practice stack height.
  - Terrain type.
  - Land use.
- Compliance with 266.106(b)(6) for facilities with multiple stacks.
- Documentation that the facility does not fail the criteria provided by §266.106(b)(7) for eligibility to comply with the screening limits.
- Proposed sampling and metals analysis plan for the hazardous waste, other fuels, and industrial furnace feed stocks.

D-9a(5) Waiver of Trial Burn for HCl/Cl<sub>2</sub>: 40 CFR 266.107(b), 266.107(e), 270.22(a)(5)

A BIF is not required to conduct a trial burn to demonstrate conformance with the HCl/Cl<sub>2</sub> standards if the BIF is operated under Tier I or adjusted Tier I feed rate screening limits for HCl/Cl<sub>2</sub> and the following documentation is submitted:

- Feed rate of hazardous waste, other fuels, and industrial furnace feed stocks.
- Levels of total chloride/chlorine in the feeds and the calculation of total feed rate of total chloride/chlorine.
- Documentation showing how the applicant will ensure the Tier I or Adjusted Tier I feed rate screening limits will not be exceeded during the averaging period under 266.107(b)(1) or (e). (See also checklist Sections C-1h and C-2g).
- Determination of the following:
  - Terrain-adjusted effective stack height.
  - Good engineering practice stack height.
  - Terrain type.
  - Land use.
- Compliance with 266.107(b)(4) for facilities with multiple stacks.

- Determination that the facility does not fail eligibility criteria under 266.107(b)(3) to comply with screening limits.
- Proposed sampling and analysis plan for total chloride and chlorine for the hazardous waste, other fuels, and industrial furnace feed stocks.

D-9b Pretrial Burn Requirements for New BIFs: 40 CFR 270.66(b)(1), 266.102(d)(4)(i), 266.102(e)

Time required to bring the new boiler or industrial furnace to a point of operational readiness for the trial burn must be the minimum necessary and cannot exceed 720 hours, or up to 1,440 hours if the applicant shows good cause for requiring an extension. The permit application must include:

- A proposed start-up schedule for the BIF.
- A description of the system that will be used to monitor operating hours during the pretrial burn period.

A statement must be submitted that stipulates the conditions necessary to operate in compliance with 266.104 through 266.107 standards and, at a minimum, includes applicable operating restrictions in 266.102(e).

Note: If the applicant is seeking a waiver from a trial burn to demonstrate conformance with a particular emission standard, the operating requirements during this initial period of operating shall include those specified by the applicable provision of 266.104 through 266.107. See checklist Section D-9a.

D-9b(1) Pretrial Burn Requirements for New BIFs - Organic Emission Standards: 40 CFR 266.102(e)(2), 266.104(d), 266.104(e), 270.66(b)(1)(i)

For conformance with organic emissions standards in 266.104, the description of operating conditions must specify the following restrictions:

- Composition of hazardous waste, including acceptable physical/chemical variations.
- Feed rate of hazardous waste and other fuels measured per 266.102(e)(6).
- Minimum device production rate when producing normal product measured per 266.102(e)(6).
- Maximum device production rate when producing normal product measured per 266.102(e)(6).
- Appropriate controls of the hazardous waste firing system.
- Allowable variation in boiler or industrial furnace system design or operating procedures. (Permit writer to specify in permit.).
- Minimum combustion gas temperature measured at a location indicative of combustion chamber temperature per 266.102(e)(6).
- Appropriate indicator of combustion gas velocity measured 266.102(e)(6).
- Such other operating requirements as are necessary to ensure that the DRE performance standard of 266.104(a) is met.
- Appropriate CO/HC limit(s) as follows:

- $\text{CO} \leq 100$  ppm when complying with 266.104(b)(1).
- CO limit based on test burn and  $\text{HC} \leq 20$  ppm when complying with 266.104(c).
- CO and HC limits from baseline HC test for furnaces with organic matter in raw material when complying with 266.104(f).
- For furnaces feeding ingredients at locations other than the hot end, the 20 ppm HC limit or baseline limit as described above applies irrespective of whether CO is  $\leq 100$  ppm.
- Hazardous waste will not be fed to the device during startup/shutdown unless it is fed as an ingredient under Tier I/Adjusted Tier I standards or as a low-risk waste.
- For boilers and industrial furnaces equipped with dry PM control devices that operate within the 450-750°F temperature range and industrial furnaces operating under the alternative HC limit, the description of operating conditions must include an evaluation of the site specific risks from emissions of dioxins and furans and demonstrate that the increased cancer risk to the hypothetical maximum exposed individual would not exceed 1 in 100,000.

D-9b(2) Pretrial Burn Requirements for New BIFs - PM Emissions Standards: 40 CFR 266.105, 270.66(b)(1)(i)

For conformance with the PM emissions standard in 266.105, the description of operating conditions must specify the following restrictions:

- Total ash feed rate from hazardous waste, other fuels, and industrial furnace feed stocks [except for cement kilns and lightweight aggregate kilns] measured per 266.102(e)(6).
- Maximum device production rate when producing normal product measured per 266.102(e)(6).
- Appropriate controls on hazardous waste firing system and air pollution control system.
- Allowable variation in boiler or industrial furnace system design or operating procedures. (Permit writer to specify in permit).
- Such other operating requirements as are necessary to ensure that the particulate standard in 266.105 is met.

D-9b(3) Pretrial Burn Requirements for New BIFs -Metals Emissions Standards: 40 CFR 266.102(e)(4)(i) and (ii), 266.106, 270.66(b)(1)(i)

For conformance with the metals emissions standards in 266.106, the operating requirements must specify the applicable restrictions listed below. The facility must also demonstrate that planned feed rate or emission limits are within maximum allowable emission/feed rates. This demonstration must include a complete description of the determination of the maximum allowable emission/feed rate for each metal.

- Tier 1 or Adjusted Tier 1:
  - Total feed rate of each metal in hazardous waste, other fuels, and industrial furnace feed stocks measured per 266.102(e)(6).

- Total feed rate of hazardous waste measured per 266.102(e)(6).
- Metals sampling and analysis program for hazardous waste, other fuels, and industrial furnace feedstocks.
- Tier II or Tier III:
  - Maximum emission rate for each metal.
  - Feed rate of total hazardous waste and pumpable hazardous waste measured per 266.102(e)(6).
  - Feed rate of each metal in each of the following feed streams measured per 266.102(e)(6):
    - Total feed streams.
    - Total hazardous waste feed.
    - Total pumpable hazardous waste feed.
  - Total feed rate of chlorine and chloride in total feed streams measured per 266.102(e)(6).
  - Maximum combustion gas temperature measured per 266.102(e)(6).
  - Maximum flue gas temperature at the inlet to the PM air pollution control system measured per 266.102(e)(6).
  - Maximum device production rate when producing normal product measured per 266.102(e)(6).
- Appropriate controls on operation and maintenance of the hazardous waste firing system and air pollution control system (APCS).
- Allowable variation in boiler or industrial furnace system design or operating procedures. (Permit writer to specify in permit.)
- Such other operating requirements as are necessary to ensure that the metals standards under 266.106(c) or (d) are met:
  - Wet scrubbers/wet ionizing scrubbers:
    - Minimum liquid to flue gas ratio.
    - Minimum scrubber blowdown or maximum suspended solids content of scrubber water.
    - Minimum pH of scrubber water.
  - Venturi scrubbers:
    - Minimum differential gas pressure across the venturi.
  - Dry scrubbers:
    - Minimum alkali feed rate.
    - Maximum flue gas flow rate.
  - Wet ionizing scrubbers/electrostatic precipitators:
    - Minimum electrical power (kVA).
    - Maximum flue gas flow rate.
  - Baghouses:
    - Minimum pressure drop.

D-9b(4) Pretrial Burn Requirements for New BIFs - Alternative Metals Approach: 40 CFR 266.102(e)(4)(iii), 266.106(f)

For conformance with the alternative metals approach, the description of operating conditions must:

- Describe the approach that will be used to comply.

- Specify how the approach ensures compliance with the metals emissions standards of 266.106(c) or (d).
- Specify how the approach can be effectively implemented and monitored.
- Provide such other information as necessary to ensure that the standards of 266.106(c) or (d) are met.

D-9b(5) Pretrial Burn Requirements for New BIFs - Hydrogen Chloride/Chlorine Emissions Standards: 40 CFR 266.102(e)(5)(i), 266.107, 270.66(b)(1)(i)

For conformance with hydrogen chloride/chlorine emissions standards in 266.107, the description of operating conditions must specify the following applicable restrictions:

- Tier I or Adjusted Tier I:
  - Feed rate of total chlorine/chloride in hazardous waste, other fuels, and industrial furnace feedstocks measured per 266.102(e)(6).
  - Feed rate of total hazardous waste measured per 266.102(e)(6).
  - Sampling and analysis program for total chlorine/chloride for hazardous waste, other fuels, and industrial furnace feedstocks.
- Tier II and Tier III:
  - Maximum emission rates of HCL and C1<sub>2</sub>.
  - Feed rate of total hazardous waste measured per 266.102(e)(6).
  - Total feed rate of chlorine and chloride in total feed streams measured per 266.102(e)(6).
  - Maximum device production rate when producing normal product measured per 266.102(e)(6).
  - Appropriate controls on operation and maintenance of hazardous waste firing system and APCS.
  - Allowable variation in boiler or industrial furnace system design or operating procedures. (Permit writer to specify in permit).
  - Such other operating requirements as are necessary to ensure that the HCL and C1<sub>2</sub> standards under 266.107(b)(2) or (c) are met.

D-9b(6) Pretrial Burn Requirements for New BIFs - Fugitive Emissions: 40 CFR 266.102(e)(7)(i), 270.66(b)(1)(i)

The description of operating conditions must thoroughly describe the method by which fugitive emissions will be controlled. Fugitive emissions must be controlled by:

- Totally sealing the combustion zone,
- Maintaining negative pressure in the combustion zone, or
- An alternative method demonstrated to provide control equivalent to maintenance of combustion zone pressure lower than atmospheric pressure.

D-9b(7) Pretrial Burn Requirements for New BIFs - Automatic Waste Feed Cutoff: 40 CFR 266.102(e)(7)(ii) and (iii), 270.66(b)(1)(i)

The description of operating conditions must specify that the automatic waste feed cut-off will operate as follows:



- Hazardous waste feed will be automatically cut-off when operating parameters deviate from those specified above for pretrial burn period. At a minimum, the automatic waste feed cut-off will be tied to all parameters listed under monitoring requirements in checklist Section D-9i.
- Minimum combustion chamber temperature will be maintained while hazardous waste or its residues remain in the combustion chamber. A description of procedures and controls used to maintain the minimum combustion chamber temperature must be included.
- Exhaust gases will be ducted to the APCS while hazardous waste or its residues remain in the combustion chamber. A description should be provided with the engineering description. See checklist Section D-9c.
- Operating parameters will be monitored during the cut-off and hazardous waste feed will not be restarted until the parameters are within allowable limits. For parameters that may be measured on an instantaneous basis, the description of operating conditions should propose a period of time after waste feed cutoff during which a parameter must not exceed the permit limit before hazardous waste feed may be restarted. The proposed period of time will be subject to the Director's approval.
- The description of operating conditions must specify that the BIF will stop burning hazardous waste when changes in combustion properties or feed rates of hazardous waste, other fuels, or industrial furnace feedstocks, or changes in BIF design or operating conditions deviate from those specified above for the pretrial burn period.

D-9b(8) Pretrial Burn Requirements for New BIFs - Monitoring Requirements: 40 CFR 266.102(e)(8), 266.102(e)(10), 270.66(b)(1)(i)

The description of operating conditions must specify that the following will be monitored and recorded when burning hazardous waste:

- All parameters listed under monitoring requirements in checklist Section D-9i.
- Sampling and analysis of hazardous waste (and other fuels and feedstocks), residues, and exhaust emissions will be conducted as necessary to verify that the operating requirements achieve the applicable standards of 266.104 through 266.107.
- The BIF will be subject to thorough visual inspections when it contains hazardous waste (at least daily) for signs of leaks, spills, fugitive emissions, and tampering.
- Automatic waste feed cut-off system will be tested at least once every 7 days when hazardous waste is burned unless the applicant demonstrates that weekly inspections unduly upset operations. At a minimum, testing must be conducted once every 30 days. A description of automatic feed cut-off system testing procedures should be included.
- The description of operating conditions must specify that operating records will be maintained until closure of the facility.

D-9c Trial Burn Plan Requirements for all BIFs: 40 CFR 266.102(d)(4)(ii), 270.66(b)(2) and (c) and (e)

For the duration of the trial burn, the operating conditions must be sufficient to demonstrate compliance with the performance standards of 266.104 through 266.107.

The trial burn plan must include the following information:

- An analysis of each feed stream, including hazardous waste, other fuels, and industrial furnace feed stocks, as fired, which includes:
  - Heating value.
  - Levels of antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, silver, thallium, total chlorine/chloride, and ash.
  - Viscosity or description of the feed stream's physical form.
- An analysis of each hazardous waste, as-fired:
  - Identification of Appendix VIII constituents that would reasonably be expected in the feed. (Note: the applicant need not analyze for Appendix VIII constituents that would reasonably not be expected to be found in the waste. The constituents excluded from analysis must be identified, and the basis for exclusion stated.)
  - Approximate quantification of the hazardous constituents identified.
  - If blending is to occur prior to the firing:
    - Detailed analysis of the hazardous waste prior to blending and of the material with which it is blended.
    - Blending ratios.
    - Description of blending procedures.
- Detailed engineering description of the boiler and industrial furnace, including:
  - Manufacturer's name and model number.
  - Type of boiler or industrial furnace.
  - Maximum design capacity in appropriate units.
  - Description of the feed system for the hazardous waste and other fuels, and industrial furnace feed stocks.
  - Capacity of hazardous waste feed system.
  - Description of automatic waste feed cutoff system(s).
  - Description of any air pollution control system.
  - Description of stack gas monitoring and pollution control monitoring systems.
- A detailed description of sampling and monitoring procedures including:
  - Sampling and monitoring equipment.
  - Sampling and monitoring frequency.
  - Sampling and analytical procedures.
  - Sampling and monitoring locations.
  - Quality assurance/quality control program.
- Test schedule for each hazardous waste:
  - Dates when trial burn is planned.
  - The duration of each trial burn.
  - The quantity of waste to be burned during each trial burn.
  - Other relevant factors.
- Test protocols for each hazardous waste including the following for each waste to be burned:
  - Ranges of hazardous waste feed rate.

- Feed rates of other fuels and industrial furnace feedstocks.
- Other parameters that may affect the ability of the BIF to meet:
  - Organic emission standards.
  - Metals emission standards.
  - PM emission standards.
  - HCL/Cl<sub>2</sub> emissions standards.
- A description of planned operating conditions for any APCS equipment that will be used.
- Procedures for stopping the hazardous waste feed and controlling emissions in the event of equipment malfunctions.
- When a DRE trial burn is required under 266.104(a), the description of operating conditions should propose principal organic hazardous constituents (POHCs) for which DRE will be calculated during the trial burn. The basis for selecting the POHCs should be described. The proposed POHCs will be subject to the Director's approval.
- Other information as the Director finds necessary.

D-9d

Trial Burn Results: 40 CFR 270.66(d), 270.66(f), 270.22(a)(6)

The following must be submitted within 90 days of the completion of the trial burn. The submittal must be certified on behalf of the applicant by the signature of a person authorized to sign a permit application or a report under 270.11.

- A statement that the trial burn has been conducted in accordance with the approved trial burn plan.
- All data collected during any trial burn must be submitted following completion of the trial burn.
- A quantitative analysis of the levels of antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, thallium, silver, and chlorine/chloride, in the feed streams (hazardous waste, other fuels, and industrial furnace feedstocks).
- If a DRE trial burn was required under 266.104(a):
  - A quantitative analysis of the trial POHCs in the hazardous waste feed.
  - A quantitative analysis of the stack gas for the concentration and mass emissions of the trial POHCs.
  - A computation of destruction and removal efficiency (DRE) in accordance with the DRE formula specified in 266.104(a).
- If a trial burn for chlorinated dioxins and furans was required under §266.104(e):
  - A quantitative analysis of the stack gas for the concentration and mass emission rate of the 2,3,7,8-chlorinated tetra-octa congeners of chlorinated dibenzo-p-dioxins and furans.
  - A computation showing conformance with the emission standard.
- If a trial burn for particulate matter, metals, or HCL/Cl<sub>2</sub> was required under 266.105, 266.106(c) or (d), or 266.107(b)(2) or (c):
  - A quantitative analysis of the stack gas for the concentrations and mass emissions of particulate matter, metals, or hydrogen chloride (HCl) and chlorine (Cl<sub>2</sub>).

- Computations showing conformance with the applicable emissions performance standards.
- If a trial burn for DRE, metals, or HCL/Cl<sub>2</sub> was required under 266.104(a), 266.106(c) or (d), or 266.107(b)(2) or (c), a quantitative analysis of the scrubber water (if any), ash residues, other residues, and products for the purpose of estimating the fate of the trial POHCs, metals, and chlorine/chloride.
- An identification of sources of fugitive emissions and their means of control.
- Records of continuous measurement of carbon monoxide (CO), oxygen, and where required, hydrocarbons (HC) in the stack gas.
- Such other information as necessary to ensure that the trial burn will determine compliance with the performance standards in 266.104 through 266.107.

D-9e Post-Trial Burn Requirements for New BIFs: 40 CFR 270.66(b)(3)(ii), 266.102(d)(4)(iii), 266.102(e)

Post-trial burn requirements for new BIFs are the same as the pretrial burn requirements for new BIFs listed in checklist Section D-9b, with the following exceptions:

- The total length of time during which a facility may burn hazardous waste is not limited after the trial burn. Therefore, no documentation of total burning hours is required.
- For the pretrial burn period, a BIF must submit a statement that suggests the conditions necessary to operate in compliance with the standards of 266.104 through 266.107. For the post-trial burn period, a BIF must submit a statement that, based upon the results of the trial burn, identifies the conditions necessary to operate in compliance with the standards of 266.104 through 266.107.
- For the post trial burn period, a BIF must submit a statement specifying that the BIF will stop burning hazardous waste when changes in combustion properties or feed rates of hazardous waste, other fuels, or industrial furnace feedstocks, or changes in BIF design or operating conditions deviate from those specified above for the post-trial burn period.

D-9f Data in Lieu of Trial Burn: 40 CFR 270.22(a)(6), 270.66(c)(3)

A BIF may seek an exemption from trial burn requirements by submitting the following information provided by previous compliance testing of the same device, or from compliance testing or trial or operational burns of similar BIFs burning similar hazardous wastes under similar conditions:

- A description and analysis of the hazardous waste to be burned compared with the hazardous waste for which data from compliance testing, operational burns, or trial burn(s) are provided to support the contention that a trial burn is not needed.
- Design and operating conditions of the boiler and or industrial furnace to be used compared with that for which data is available and being submitted.
- A detailed engineering description of the boiler or industrial furnace to be used compared with that for which data is available and being submitted. The following must be described for both BIF units:

- Manufacturer's name and model number of the BIF;
- Type of boiler or industrial furnace;
- Maximum design capacity;
- Description of the feed system for the hazardous waste, other fuels, and industrial furnace feedstocks;
- Capacity of hazardous waste feed system;
- Description of automatic hazardous waste feed cutoff system(s);
- Description of APCS; and
- Description of stack gas monitoring and air pollution control monitoring systems.
- Such other information necessary to support the contention that a trial burn is not needed.
- All data and results from the previous testing. The data and results submitted must include all of the information listed under Trial Burn Results in checklist Section D-9d.

D-9g

Alternative HC Limit for Industrial Furnaces with Organic Matter in Raw Materials: 40 CFR 270.22(b), 266.104(f)

Industrial furnaces requesting the alternative HC limit must submit the following information:

- Documentation that the furnace is designed and operated to minimize HC emissions from fuels and raw materials.
- Statement of proposed baseline HC and CO levels.
- Basis for the proposed baseline flue gas HC and CO concentrations, including data on HC and CO levels during tests when the facility produced normal products under normal operating conditions from normal raw materials while burning normal fuels and when not burning hazardous waste.
- Test burn protocol to confirm baseline HC and CO levels, including information on type and flow rate of all feed streams, point of introduction of feed streams, total organic carbon content (or other appropriate measure of organic content) of all nonfuel feed streams and operating conditions that affect combustion of fuel(s) and hydrocarbon emissions from nonfuel sources.
- Trial burn plan to:
  - Demonstrate that flue gas HC and CO concentrations when burning hazardous waste do not exceed baseline levels.
  - Identify types and concentrations of organic compounds listed in Part 261 Appendix VIII that are emitted when burning hazardous waste.
- Implementation plan to monitor over time changes in operation that could reduce the baseline HC levels.
- Procedures to periodically confirm baseline levels.
- Such other information as necessary to ensure that the requirements of 266.104(f) are met.

D-9h

Alternative Metals Implementation Approach: 40 CFR 270.22(c), 266.106(f)

For conformance with an alternative metals implementation approach, the information must:

- Describe the approach that will be used to comply.
- Specify how the approach ensures compliance with the metals emissions standards of 266.106(c) or (d).
- Specify how the approach can be effectively implemented and monitored.
- Provide such other information as necessary to ensure that the standards of 266.106(c) or (d) are met.

D-9i

Monitoring Requirements: 40 CFR 266.102(e)(6), 266.102(e)(8)

The following must be monitored on a continuous basis per 266.102(e)(6) while burning hazardous waste. Feed rates for metals, total chlorine and chloride, and ash are continuously monitored by knowing the concentration of the constituent (through periodic waste analyses) in each feed stream and continuously monitoring the flow rate of each feed stream. Data must be maintained in the operating record until closure of the facility.

- For conformance with the organic emission standards in 266.104:
  - Feed rate of hazardous waste and other fuels.
  - Device production rate.
  - Combustion gas temperature.
  - Appropriate indicator of combustion gas velocity.
  - Carbon monoxide and oxygen.
  - Total hydrocarbons (if complying with 266.104(c), (d) or (f) ).
- or, if the waiver of DRE trial burn for boilers applies:
  - Carbon monoxide and oxygen.
- or, if the low risk waste exemption applies:
  - Carbon monoxide and oxygen.
- For conformance with the particulate emission standard in 266.105, unless the particulate standard is waived under 266.109(b):
  - Total ash feed rate from hazardous waste, other fuels, and industrial furnace feed stocks [except for cement kilns and lightweight aggregate kilns].
  - Device production rate.
- For conformance with the metal emission standards in 266.106:
  - Tier I or adjusted Tier I:
    - Total feed rate of each metal in hazardous waste, other fuels, and industrial furnace feed stocks.
    - Total feed rate of hazardous waste.
  - Tier II or Tier III:
    - Feed rate of total hazardous waste.
    - Feed rate of pumpable hazardous waste.
    - Feed rate of each metal in the following feed streams:
      - Total feed streams.
      - Total hazardous waste feed.
      - Total pumpable hazardous waste feed.

- Total feed rate of chlorine/chloride in total feed streams.
  - Combustion gas temperature.
  - Flue gas temperature at the inlet to the air pollution control system.
  - Device production rate.
- Alternative Metals Approach (including the Kiln Dust Monitoring Approach in 266 Appendix IX):
  - (same as Tier II requirements except for feed rate of metals in total feed streams)
- For conformance with HCl/Cl<sub>2</sub> emission standards in 266.107:
  - Tier I or adjusted Tier I:
    - Feed rate of total chlorine/chloride in hazardous waste, other fuels, and industrial furnace feed stocks.
    - Feed rate of total hazardous waste.
  - Tier II or Tier III:
    - Feed rate of total hazardous waste.
    - Total feed rate of chlorine/chloride in total feed streams.
    - Production rate when producing normal product.
- For other operating requirements as may be necessary to ensure that the performance standards of 266.104 through 266.107 are met:
  - Wet scrubbers/wet ionizing scrubbers.
    - Liquid to flue gas ratio.
    - Scrubber blowdown or suspended solids content of scrubber water.
    - pH of scrubber water.
  - Venturi scrubbers.
    - Minimum differential gas pressure.
  - Dry scrubbers.
    - Caustic feed rate.
    - Flue gas flow rate.
  - Wet ionizing scrubbers/electrostatic precipitators.
    - Electrical power (kVA).
    - Flue gas flow rate.
  - Baghouses.
    - Pressure drop.

D-9j Automatic Waste Feed Cut-off System: 40 CFR 270.22(d), 266.102(e)(7), (ii)

All facilities must submit a description of the automatic waste feed cut-off system, including any pre-alarm system that may be used. The description must include:

- A statement that hazardous waste feed will be automatically cut off when operating conditions deviate from those established under 266.102.
- A list of all parameters tied into the automatic waste feed cut-off system. At a minimum, the system must be tied to all parameters listed under monitoring requirements in checklist Section D-9i.

- A description of procedures and controls used to maintain the minimum combustion chamber temperature while hazardous waste residues remain in the combustion chamber.
- A statement that exhaust gases will be ducted to the APCS while hazardous waste or its residues remain in the combustion chamber.
- A statement that operating parameters will be monitored during the cut-off and hazardous waste feed may not be restarted until the parameters are within allowable limits. For parameters that may be measured on an instantaneous basis, the statement should propose a period of time after waste feed cut-off during which a parameter must not exceed the permit limit before hazardous waste feed may be restarted. The proposed period of time will be subject to the Director's approval.

D-9k

Direct Transfer Standards: 40 CFR 266.111, 270.22(e), Part 264 Subparts I and J

BIFs that directly feed hazardous waste from a transport vehicle to a BIF without the use of a storage unit must submit the following:

- A description of direct transfer procedures that will be used.
- A statement and description of procedures to ensure that no direct transfer of a pumpable hazardous waste shall be conducted from an open-top container to a boiler or industrial furnace.
- A statement and description of procedures to ensure that direct transfer equipment used for pumpable hazardous waste shall always be closed, except when necessary to add or remove the waste, and shall not be opened, handled, or stored in a manner that may cause any rupture or leak.
- A description of direct transfer operations, including procedures and controls implemented so that transfer operations do not:
  - Generate extreme heat or pressure, fire, explosion, or violent reaction.
  - Produce uncontrolled toxic mists, fumes, dusts, or gases in sufficient quantities to threaten human health.
  - Produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion.
  - Damage the structural integrity of the container or direct transfer equipment containing the waste.
  - Adversely affect the capability of the BIF to meet the standards provided in 266.104 through 266.107.
  - Threaten human health and the environment.
- A statement and description of procedures to ensure that hazardous waste shall not be placed in direct transfer equipment if it could cause the equipment or its secondary containment system to rupture, leak, corrode, or otherwise fail.
- A description of controls and practices that will be used to prevent spills and overflows from the direct transfer equipment or its secondary containment systems including at a minimum:
  - Spill prevention controls (e.g., check valves, dry disconnect couplings).
  - Automatic waste feed cutoff if a leak or spill occurs from the equipment.

D-9k(1)

Direct Transfer Standards - Containment System: 40 CFR 264.175



In areas where direct transfer vehicles are located, a description of the containment system, demonstrating that the containment system is designed and operated as follows (containment system requirements also apply to areas that store containers with F020, F021, F022, F023, F026, or F027 even though the containers may not contain free liquids):

- A base underlies the containers that is free of cracks or gaps and is sufficiently impervious to contain leaks, spills, and accumulated precipitation until the collected material is detected and removed.
- The base is sloped or the containment system is otherwise designed and operated to drain and remove liquids resulting from leaks, spills, or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids.
- The containment system has sufficient capacity to contain 10% of the volume of containers or the volume of the largest container, whichever is greater. Containers that do not contain free liquids need not be considered in this determination.
- Run-on into the containment system is prevented unless the collection system has sufficient excess capacity to contain any run-on that might enter the system.
- Spilled or leaked waste and accumulated precipitation is removed from the sump or collection area in as timely a manner as is necessary to prevent overflow of the collection system.
- Except for areas with containers storing F020, F021, F022, F023, F026 and F027, storage areas that store containers holding only wastes that do not contain free liquids need not have a containment system defined above provided that:
  - The storage area is sloped or is otherwise designed and operated to drain and remove liquid resulting from precipitation.
  - The containers are elevated or are otherwise protected from contact with accumulated liquid.

D-9k(2) Direct Transfer Standards - Condition of Containers: 40 CFR 264.171

Provide a statement and description of procedures to ensure that if a container holding hazardous waste is not in good condition, or if it begins to leak, the owner or operator will transfer the hazardous waste from this container to a container that is in good condition, or manage the waste in some other way that complies with the requirements of this part.

D-9k(3) Direct Transfer Standards - Compatibility of Waste with Container: 40 CFR 264.172

Provide a statement that the owner or operator will use a container made of or lined with materials that will not react with, and are otherwise compatible with, the hazardous waste to be stored, so that the ability of the container to contain the waste is not impaired.

D-9k(4) Direct Transfer Standards - Management of Containers: 40 CFR 264.173

Provide a statement that:

- A container holding hazardous waste will always be closed during storage, except when it is necessary to add or remove waste.
- A container holding hazardous waste will not be opened, handled, or stored in a manner that may rupture the container or cause it to leak.

D-9k(5) Direct Transfer Standards - Special Requirements of Ignitable or Reactive Waste: 40 CFR 264.176

Provide documentation of the location of all containers holding ignitable/reactive waste. Containers holding ignitable/reactive waste must be located at least 50 feet from the facility property line or comply with requirements for the maintenance of distances between waste management areas and any public ways, streets, alleys, or adjacent property line that can be built upon as required in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Codes," (1977 or 1981).

D-9k(6) Direct Transfer Standards - Special Requirements of Incomplete Wastes: 40 CFR 264.177

Provide a statement and description of procedures to ensure that:

- Incompatible wastes, or incompatible wastes and materials will not be placed in the same container.
- Hazardous waste will not be placed in an unwashed container that previously held an incompatible waste or material.
- A storage container holding a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments will be separated from the other materials or protected from them by means of a dike, berm, wall, or other device.

D-9k(7) Direct Transfer Standards - Closure: 40 CFR 264.178

Describe how all hazardous waste and hazardous waste residues will be removed from the containment system at closure. Remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues must be decontaminated or removed.

D-9k(8) Direct Transfer Standards - Secondary Containment Requirements: 40 CFR 266.111(e)

Owners/operators must submit documentation demonstrating conformance with secondary containment requirements of 265.193(b), (c), and (f) - (h):

- For new direct transfer equipment, prior to their being put into service; and
- For existing direct transfer equipment, by August 21, 1993.
- Prior to meeting secondary containment requirements, existing direct transfer without such containment must be assessed to determine its fitness for use. The owner shall keep on file a written assessment reviewed and certified by a

registered professional engineer that attests to the equipments integrity by August 21, 1992. At a minimum, this assessment should consider:

- Design standards;
- Waste characteristics;
- Existing corrosion protection measures;
- Documented age;
- Results of leak test or other integrity determination.
- If leaking or unfit, the requirements of 264.196(a) and (b) must be followed.
- Inspections must be made at least once each hour when hazardous waste is being transferred and records made in accordance with 266.111(e)(3).
- Provide documentation that design and installation of new ancillary equipment meets 264.192.
- Provide documentation that responses to leaks or spills comply with 264.196.

D-91

Bevill Residues: 40 CFR 266.112, Part 266 Appendices VII and IX, 270.22(f)

Owners/operators claiming residues are excluded from regulation must submit the following applicable information to demonstrate conformance with 266.112:

- Boilers: Boilers must burn at least 50% coal on a total heat input or mass input basis, whichever results in the greater mass feed rate of coal.
- Ore or Mineral Furnaces: Industrial furnaces subject to 261.4(b)(7) must process at least 50% by weight normal, nonhazardous raw materials.
- Cement Kilns: Cement kilns must process at least 50% by weight normal cement-production raw materials.
- Either of the following two criteria must be demonstrated to show that the hazardous waste does not significantly affect the residue:

- (1) -Comparison of Waste-Derived Residue with Normal Residue: The waste-derived residue does not contain Part 261 Appendix VIII constituents (toxic constituents) that could reasonably be attributable to the hazardous waste at concentrations significantly higher than in residue generated without burning or processing of hazardous waste. Toxic constituents include Appendix VIII constituents in the waste and those Appendix VIII constituents that may be generated as products of incomplete combustion.

-Concentration of toxic constituents of concern in normal residue shall be determined based on analyses of a minimum of 10 samples representing a minimum of 10 days of operation. Composite samples may be used to develop a sample for analysis provided that the compositing period does not exceed 24 hours. The upper tolerance limit (at 95% confidence with a 95% proportion of the sample distribution) of the concentration in the normal residue shall be considered the statistically-derived concentration in the normal residue. The baseline must be revised if changes in the raw material or fuel occur. The statistical procedures in "Statistical Methodology for Bevill Residue Determinations" in Appendix IX shall be used to determine upper tolerance limit.

-Waste-derived residue shall be sampled and analyzed as often as necessary to determine whether the residue generated during each 24-hour period has concentrations of toxic constituents that are higher than the concentrations established for the normal residues. If so, the residue shall not be excluded from the definition of a hazardous waste. Concentrations of toxic constituents of concern in the waste-derived residue shall be determined based on analysis of one or more samples obtained over a 24-hour period.

(2) Comparison of Waste-Derived Residue Concentrations with Health-Based Limits:

-The concentration of each nonmetal toxic constituent of concern in the waste-derived residue does not exceed the health based levels specified in Appendix VII of Part 266 or the level of detection (using analytical procedures in SW-846), whichever is higher. If a health-based limit for a constituent of concern is not listed in Appendix VII of this part, then a limit of 0.002 micrograms per kilogram or the level of detection, whichever is higher, shall be used.

-The concentration of each metal in an extract obtained using the Toxicity Characteristic Leaching Procedure of 261.24 does not exceed the levels specified in 266 Appendix VII.

-Waste-derived residue shall be sampled and analyzed as often as necessary to determine whether the residue generated during each 24-hour period has concentrations of toxic constituents that are higher than the health-based levels. Concentrations of toxic constituents of concern in the waste-derived residue shall be determined based on analysis of one or more samples obtained over a 24-hour period.

- Documentation: Records sufficient to document the following shall be retained until closure of the BIF:
  - Levels of Appendix VIII constituents that are present in the waste-derived residues.
  - If the waste-derived residue is compared with normal residue:
    - Levels of Appendix VIII constituents that are present in normal residues.
    - Data and information obtained to determine if changes in raw material or fuels would reduce the concentrations of toxic constituents of concern in the normal residue.

Summary of Emissions Standards [Note: The following section is a summary of applicable emissions standards. It is provided for the benefit of the permit writer and supplements the checklist sections detailed above. It is not intended, however, that a checklist be completed covering the following information.]

1. Carbon Monoxide/Hydrocarbon (CO/HC) Emissions Standards: 40 CFR 266.104, 266.104(b)(1), 266.104(f), 270.22(b)

CO cannot exceed 100 ppmv (hourly rolling average) over any 60 minute period continuously corrected to 7% oxygen on a dry gas basis; or

CO may exceed 100 ppmv (and is established based on the trial burn) provided that hydrocarbon emissions do not exceed 20 ppmv reported as propane (hourly rolling average) corrected to 7% oxygen on a dry gas bases; or

If approved by the Director on a case-by-case basis, industrial furnaces that cannot meet the 20 ppmv HC standard due to organic matter in the normal raw material (except cement kilns equipped with by-pass ducts described in 266.104(g)) may establish, during the trial burn, an alternative HC limit that ensures that HC emissions when burning hazardous waste are not greater than when not burning hazardous waste, provided the following is demonstrated when applying for the alternative HC standard:

- The facility is designed and operated to minimize HC emissions from fuels and raw materials;

- Emissions testing must be conducted to determine the baseline HC and CO levels; emissions from hazardous waste burning do not exceed these baselines; identify the types and concentrations of Part 261 Appendix VIII organic constituents that are emitted; and conduct dispersion modeling for emission of Appendix VIII constituents to predict maximum annual average ground level concentrations;

- Test burn protocol to confirm the baseline HC (and CO) level including information on the type and flow rate of all feed streams, point of introduction of all feed streams, total organic carbon content (or other appropriate measure of organic content) of all nonfuel feed streams. and operating conditions that affect combustion of fuels(s) and destruction of hydrocarbon emissions from nonfuel sources;

- The maximum annual average ground level concentrations cannot exceed those levels established in Appendix IV or V of Part 266 (or 0.1ug/m<sup>3</sup> for compounds not listed in these appendices);

- An approach must be developed to monitor changes over time in operations that could reduce the HC baseline.

## 2. Cement Kilns and CO/HC Standards: 40 CFR 266.104(g)

Cement kilns may comply with the CO/HC standards described above by monitoring in the by-pass duct provided that:

- Hazardous waste is fired only into the kiln;

- The by-pass duct directs a minimum of 10% of kiln off-gas into the duct.

3. Destruction and Removal Efficiency (DRE) for Organics: 40 CFR 266.104(a)

DRE for all organic hazardous constituents in the waste feed must meet or exceed 99.99%.

DRE for all dioxin-listed wastes in the waste feed must meet or exceed 99.9999%.

4. Dioxin/Furan Emissions Controls: 40 CFR 266.104(c)

BIFs that are equipped with a dry particulate matter control device that operates within the temperature range of 450 - 750° F, and industrial furnaces operating under an alternative hydrocarbon limit established under 266.104(f) must conduct a site-specific risk assessment as described in 266.104(e) to demonstrate that emissions of chlorinated dibenzo-p-dioxins and dibenzofurans do not result in an increased lifetime cancer risk to the hypothetical maximum exposed individual exceeding 1 in 100,000.

5. Particulate Matter (PM) Emissions Standard: 40 CFR 266.105(a)

PM cannot exceed 180 mg/dscm corrected to 7% oxygen (0.08 grains/dscf).

6. Metals Emissions Standard: 40 CFR 266.106, 266 Appendix I

Owners/operators of BIFs must comply with either the Tier I, Tier II, Tier III, or Adjusted Tier I metals feed rate limits.

The facility must use Tier III metals controls if any of the following criteria are met:

-The device is located in a narrow valley less than 1 km wide.

-The device has a stack taller than 20 meters and is located such that the terrain rises to the physical height within 1 km of the facility.

-The device has a stack taller than 20 meters and is located within 5 km of a shoreline of a large body of water, such as an ocean or large lake.

-The physical stack height of any stack is less than 2.5 times the height of any building within 5 building heights or 5 projected building widths of the stack, and the distance from the stack to the closest boundary is within 5 building heights or 5 projected building widths of the associated building, or

-The Director determines that standards based on site-specific dispersion modeling are required.

7. Hydrogen Chloride/Chlorine Emissions Standards: 40 CFR 266.107, 266.107(b)(3), Part 266 Appendices II - IV

HCl/Cl<sub>2</sub> must meet either Tier I, Tier II, Tier III, or Adjusted Tier I feed rate limits.

The facility must use Tier III HCl/Cl<sub>2</sub> controls if any of the following criteria are met:

-The device is located in a narrow valley less than 1 km wide.

-The device has a stack taller than 20 meters and is located such that the terrain rises to the physical height within 1 km of the facility.

-The physical stack height of any stack is less than 2.5 times the height of any building within 5 building heights or 5 projected building widths of the stack, and the distance from the stack to the closest boundary is within 5 building heights or 5 projected building widths of the associated building, or

-The Director determines that standards based on site-specific dispersion modeling are required.

D-10 Containment Buildings: 40 CFR 260.10, 264.1100, 264.1101, 264.1102

D-10a Containment Building Description: 40 CFR 264.1100(a), 264.1101(a)

D-10a(1) Construction: 40 CFR 264.1100(a), 264.1101(a)

Provide a description of the unit including dimensions and materials of construction. The containment building must be completely enclosed with a floor, walls and a roof to prevent exposure to the elements, and to assure containment of managed wastes. The unit must be constructed of manmade materials of sufficient strength and thickness to support themselves, the waste contents, and any personnel and heavy equipment that operate within the unit. The unit must be constructed to prevent failure due to pressure gradients, settlement, compression, uplift, physical contact with the wastes, climatic conditions, or the stresses of daily operation.

D-10a(2) Strength Requirements: 40 CFR 264.1100(a), 264.1101(a)

Provide the results of calculations defining the maximum loads or stresses that will be placed on the containment building system, including:

- Both static and dynamic loads;

- Stresses due to installation and construction operations;
- Stresses due to the maximum quantity of waste;
- Stresses due to personnel and heavy equipment that operate within the unit;
- Stresses from settlement, compression, or uplift;
- Internal and external pressure gradients; and
- Climatic conditions (freeze-thaw stress).

D-10a(3) Design Requirements for Units Not Managing Liquids: 40 CFR 264.1100(b), 264.1101(a)

D-10a(3)(a) Primary Barrier: 40 CFR 264.1100(a), 264.1100(b), 264.1101(a)(4)

Provide a detailed description of the primary barrier, and demonstrate that it is sufficiently durable to withstand the movement of personnel, wastes, and handling equipment within the unit. Demonstrate that the primary barrier is appropriate for the physical and chemical characteristics of the waste to be managed.

D-10a(4) Design Requirements for Units Managing Liquids: 40 CFR 264.1100(c), 264.1101(a)(4), 264.1101(b)

Containment buildings used to manage hazardous wastes containing free liquids or treated with free liquids (the presence of which is determined by the EPA Method 9095 paint filter test, a visual examination, or other appropriate means), must include the following features.

D-10a(4)(a) Primary Barrier: 40 CFR 264.1100(c)(1), 264.1101(b)(1)

Describe how the primary barrier is designed and constructed to prevent migration of hazardous constituents into the barrier (e.g., geomembrane covered by a concrete wear surface). For synthetic liners identify:

- Thickness;
- Type;
- Material; and
- Brand name and manufacturer.

Demonstrate that the primary barrier is constructed of materials of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building.

D-10a(4)(b) Liquid Collection System: 40 CFR 264.1100(c)(2), 264.1101(b)(3)

Describe in detail the liquid collection system that must be designed and constructed of materials to minimize the accumulation of liquid on the primary barrier.

Demonstrate that the primary barrier is sloped to drain liquids to the associated collection system. Provide design and operating details of the associated collection



system. Describe procedures to ensure that all liquids and waste in the collection system will be promptly removed to minimize hydraulic head on the containment system.

Demonstrate that the liquid collection system is constructed of materials of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building.

D-10a(4)(c) Secondary Containment System: 40 CFR 264.1100(c)(3)

Describe in detail the secondary containment system including a secondary barrier, which must be designed and constructed to prevent migration of hazardous constituents into the secondary barrier. The secondary containment system must also include a leak detection system that is capable of detecting failure of the primary barrier and collecting accumulated wastes and liquids at the earliest possible time.

D-10a(4)(c)(i) Leak Detection System: 40 CFR 264.1100(c)(3), 264.1101(a), 264.1101(b)(3)

Describe the design and operating features of the leak detection system, which must be located between the primary and secondary barriers. Demonstrate that the leak detection component of the secondary containment system is, at a minimum, constructed with a bottom slope of 1% or more.

Describe the leak detection system drainage material. Demonstrate that the detection system is constructed of granular drainage material with a hydraulic conductivity of  $1 \times 10^{-2}$  cm/sec or more and a thickness of 12 inches (30.5 cm) or more, or constructed of synthetic or geonet drainage materials with a transmissivity of  $3 \times 10^5$  m<sup>2</sup>/sec or more.

Provide complete details of the piping system, sumps, pumps, etc. and demonstrate that the pipes and pipe perforations are sized sufficiently to handle the expected flow of leachate. Provide sufficient piping to provide for rapid and timely detection of any leakage. The leak detection system must be separate from any containment building liquid collection system sumps.

Demonstrate that the leak detection system is constructed of materials of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building.

D-10a(4)(c)(ii) Secondary Barrier: 40 CFR 264.1100(b)(3), 264.1101(b)(3)

Describe how the secondary barrier is designed and constructed to prevent migration of hazardous constituents in the barrier. Provide the following information:

- Thickness;
- Type;
- Material; and
- Brand name and manufacturer.

Demonstrate that the secondary barrier is constructed of materials of sufficient strength and thickness to prevent collapse under the pressure exerted by overlaying materials and by any equipment used in the containment building.

D-10a(4)(d) Temporary Variance from Secondary Containment Requirements: 40 CFR 264.1101(b)(4)

For existing units, the Regional Administrator may delay the secondary containment requirements for up to two (2) years. To obtain such a variance: (1) provide written notice of the request was submitted to the Regional Administrator by November 16, 1992; (2) describe the units and operating practices with specific reference to the performance of existing containment system; and (3) describe specific plans to retrofit the unit with secondary containment.

D-10a(4)(e) Waiver of Secondary Containment Requirements: 40 CFR 264.1101(e)

If requesting a waiver from secondary containment requirements, demonstrate that the only free liquids that will be in the unit will be a limited amount of dust suppression liquids required to meet occupational health and safety requirements. Describe in detail how containment of managed wastes and liquids can be assured without a secondary containment system.

D-10a(5) Design of Units Managing Both Liquids and Non-Liquids in the Same Unit: 40 CFR 264.1101(d)

Identify the areas of the containment building that are constructed both with and without secondary containment, if applicable. Demonstrate that the unit is constructed in accordance with the requirements of 264.1101(a) (see checklist Sections D-10a(3), and D-10a(4) above).

D-10a(6) Compatibility of Structure with Wastes: 40 CFR 264.1101(a)(2), 264.1101(b)(3)(iii)

Demonstrate that all surfaces in contact with hazardous wastes, collected liquids, or leachate must be chemically compatible with those wastes. For those units that manage liquids, demonstrate the secondary containment system is constructed of materials that are chemically resistant to the waste and liquids managed in the containment building.

D-10a(7) Fugitive Dust Emissions: 40 CFR 264.1100(d), 264.1101(c)(1)(iv), Part 60 Appendix A

Describe in detail the system used to prevent fugitive dust emissions such that any opening (e.g., doors, windows, vents, cracks, etc.) exhibit no visible emissions (as defined in 40 CFR Part 60 Appendix A Method 22). Describe the design, operation, and maintenance of particulate collection devices that will be used in the unit to control air pollution.

D-10a(8) Structural Integrity Requirements: 40 CFR 264.1101(a)(2)

Describe the professionally recognized standards (e.g., American Concrete Institute [ACI], American Society of Testing Materials [ASTM], etc.) that were or will be used to judge and meet the structural integrity requirements of the unit (as described in checklist Section D-10a(2)).

If appropriate to the nature of the waste management operations, an exception to the structural strength requirement may be made for light-weight doors and windows, provided that: (1) they provide an effective barrier against fugitive emissions, and (2) the unit is designed and operated in a fashion that assure wastes will not actually come in contact with these openings. Identify any portions of the unit that do not meet the structural strength requirements (see checklist Section D-10a(2)).

D-10a(9)      Certification of Design: 40 CFR 264.1101(c)(2)

Provide a certification by a qualified registered professional engineer that the containment building design meets the requirements of 264.1101(a) through 264.1101(c) [see checklist Sections D-10a(1) through D10a(7)]. For units placed into operation prior to February 18, 1993, certification must be placed in the facility's operating record no later than 60 days after the date of initial operation of the unit. For units placed into operation on or after February 18, 1993, indicate that certification by a registered professional engineer will be provided prior to operation of the unit.

D-10b      Containment Building Operations: 40 CFR 264.1101(c)

D-10b(1)      Primary Barrier Integrity: 40 CFR 264.1101(c)(1)(i), 264.1101(b)(2)(ii)

Describe how the owner/operator will maintain the primary barrier to be free of significant cracks, gaps, corrosion, or other deterioration that could cause hazardous waste to be released from the primary barrier.

In order to minimize the accumulation of liquids on the primary barrier of the containment building, describe how liquids and waste that may accumulate in the liquid collection system will be removed at the earliest practical time to minimize hydraulic head.

D-10b(2)      Volume of Waste: 40 CFR 264.1101(c)(1)(ii)

Describe how the owner/operator will maintain the level of the stored and/or treated hazardous waste within the containment walls of the unit so that the height of any containment wall is not exceeded.

D-10b(3)      Tracking of Waste out of Unit: 40 CFR 264.1100(e), 264.1101(c)(1)(iii)

Describe how owner/operator will prevent the tracking of hazardous waste out of the unit by personnel or by equipment used in handling the waste.

D-10b(4)      Liquids Removal: 40 CFR 264.1101(b)(2)(ii), 264.1101(b)(3)

Describe the sumps and liquid removal methods of the liquids collection and leak detection systems sufficient to collect and remove liquids from sumps and prevent liquids from backing up into the drainage layer. Indicate the fate of the collected liquids and leachates, which are considered hazardous wastes.

D-10b(5)      Management of Incompatible Wastes: 40 CFR 264.1101(a)(3)

Indicate whether incompatible wastes or treatment reagents will be placed in the unit or its secondary system. If incompatible wastes or treatment reagents are placed in the unit, describe procedures to ensure that the incompatible wastes will not cause the unit or secondary containment system to leak, corrode, or otherwise fail.

D-10b(6)      Management of Liquids and Non-Liquids in the Same Unit: 40 CFR 264.1101(d)(2), 264.1101(d)(3)

For containment buildings that contain areas both with and without secondary containment, describe measures to prevent the release of liquids or wet materials into areas without secondary containment.

Indicate that the facility's operating log will include a written description of operating procedures used to maintain the integrity of areas of the containment building that do not have secondary containment.

D-10b(7)      Fugitive Dust Emissions: 40 CFR 264.1100(d), 264.1101(c)(1)(iv), Part 60 Appendix A

Describe the controls used to prevent fugitive dust emissions such that any opening (e.g., doors, windows, vents, cracks, etc) exhibit no visible emissions (as defined in 40 CFR Part 60 Appendix A Method 22). Describe the design, operation, and maintenance of particulate collection devices that will be used in the unit to control air pollution. Describe how the state of no visible emissions will be effectively maintained at all times during routine operating and maintenance conditions, including when vehicles and personnel are entering and exiting the unit.

D-10b(8)      Treatment of Wastes: 40 CFR 264.1101(b)(3)(ii)

If treatment of wastes is conducted in the containment building, describe how treatment will be conducted to prevent the release of liquids, wet materials, or liquid aerosols to other portions of the building.

D-10b(9)      Equipment Decontamination: 40 CFR 264.1101(c)(1)(iii)

Identify the area used to decontaminate equipment and collect and manage any rinsate from decontamination. Identify the fate of the decontamination residues.

D-10c          Containment Buildings as Tank Secondary Containment: 40 CFR 264.1101(b)(3)(iii)

Indicate whether the containment building is intended to serve as a secondary containment system for a tank placed in the building. The unit can serve as an acceptable external liner system for a tank, provided it meets the requirements of 264.193(d)(1), 264.193(b), 264.193(c)(1), and 264.193(c)(2) [see checklist Sections D-2d(1)(b) and D-2d(1)(c)].

**E. GROUNDWATER MONITORING**

[NOTE: Section E should be used for Part B applications from facilities with landfills, surface impoundments, waste piles and land treatment units. Section E should also be used to develop groundwater monitoring programs at those Subpart X units where the potential for groundwater or subsurface contamination exists. For corrective actions at other solid waste management units, use Section J.]

E-1 Exemption from Groundwater Protection Requirements: 40 CFR 270.14(c)

If a waiver from the Subpart F groundwater monitoring requirements is requested, the owner or operator must demonstrate that one of the following applies to the facility.

E-1a Waste Piles: 40 CFR 270.18(b), 264.90(b)(2) and (5)

Demonstrate that the waste pile is designed and operated to meet the conditions specified in D-3b(1), D-3b(2), or D-3l.

E-1b Landfill: 40 CFR 264.90(b)(2)

Demonstrate that the landfill is designed and operated to meet the conditions specified in D-6b(4).

E-1c No Migration: 40 CFR 264.90(b)(4)

Demonstrate that there is no potential for migration of liquid from a regulated unit to the uppermost aquifer during the active life of the requested unit (including the closure period) and the post-closure care period. (Predictions must be based on assumptions that maximize the rate of liquid migration). The demonstration must be certified by a qualified geologist or geotechnical engineer.

E-2 Interim Status Groundwater Monitoring Data: 40 CFR 270.14(c)(1), 265.90 through 265.94

Existing facilities must provide a summary of the groundwater monitoring data obtained during the interim status periods, including:

E-2a Description of Wells: 40 CFR 265.91

A copy of the topographic map provided for Section 270.14(b) on which the location and identification on each interim status monitoring well is indicated.

An indication of which wells are downgradient of the disposal area, and which are upgradient.

Details of the design and construction of each interim status monitoring well (e.g., screen and casing depths, water levels at time of drilling, any water level changes within 24 hours, filter pack and sealing materials placement, dates of construction, boring logs, etc.).

E-2b      Description of Sampling/Analysis Procedures: 40 CFR 265.92

A copy of the facility's groundwater sampling and analysis plan [required under §265.92(a)] that includes the procedures used and the protocol followed in:

- sample collection,
- sample preservation and shipment,
- analytical procedures,
- chain-of-custody.

Provide a complete Quality Assurance Project Plan (QAPjP) for the groundwater sampling and analysis plan. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

E-2c      Monitoring Data: 40 CFR 265.92

Provide all interim status monitoring results, including the following:

- Copies of each quarterly (from first year) analytical results for each well;
- Copies of subsequent (annual or semi-annual) analytical results for each well;
- Copies of any notifications of significant change in analysis parameters made to the regional Administrator (or State Director) pursuant to 265.93;
- Results of groundwater surface elevation measurements for each sampling event; and
- Calculations of the initial background arithmetic mean and variance for each indicator parameter based on replicated measurements from upgradient wells during the first year;

E-2d      Statistical Procedures: 40 CFR 265.93

Provide information relating to statistical procedures, including the following:

- A description of the statistical procedures used (if applicable) in processing the data submitted (as in the use of a Student's t-test and the level of significance used); and
- Results of statistical comparison between upgradient and downgradient well sampling results and first year background values for each indicator parameter;

E-2e      Groundwater Assessment Plan: 40 CFR 265.93(d)(2)

If required, based on statistical comparison results, provide the specific plan for a groundwater quality assessment program along with results from implementation of the plan. Where required, include results of the following determinations made under the groundwater quality assessment (considering at a minimum, the hazardous constituents listed in Appendix VIII to 40 CFR Part 261):

- Whether hazardous waste or hazardous waste constituents have entered the groundwater;
- The rate and extent of migration of hazardous waste or hazardous waste constituents in the groundwater; and
- The concentrations of hazardous waste or hazardous waste constituents in the groundwater.

E-3      General Hydrogeologic Information: 40 CFR 270.14(c)(2)

Identify the uppermost aquifer and any hydraulically interconnected underlying aquifers (i.e., all likely subsurface flow paths for hazardous constituents that may leak from the facility), and describe their hydrogeologic properties (e.g., hydraulic gradient, groundwater flow, rate and direction); provide the supporting data used to identify this information (i.e., the information obtained from hydrogeologic investigations of the facility area). This identification must include a report written by a qualified hydrogeologist on the hydrogeologic characteristics of the facility property supported by at least the drilling logs of on-site borings and wells and the available professional literature. Include a description of the regional geologic and hydrogeologic setting. In addition, include the following site-specific data:

- An analysis of topographic or geomorphic features that might influence the groundwater flow system;
- A classification and description of the hydrogeologic properties (hydraulic conductivity, porosity, texture, thickness, etc.) of all of the hydrogeologic units found at the site (i.e., the aquifers and any intervening saturated and unsaturated units);
- Using the §270.14(b)(19) topographic map as a base, isopach and structural contour maps and/or geologic cross sections showing the extent of the hydrogeologic units contained in the uppermost aquifer, and any intervening aquitards or other units within the facility boundary; and
- A description of the field methods used in the study, and a summary of which data were collected by each method.

E-4      Topographic Map Requirements: 40 CFR 270.14(c)(2), (3), (4)(i)

Unless exempt from groundwater monitoring requirements, surface impoundments, waste piles, land treatment, and landfill facilities must include the following information on the topographic map:

- Groundwater flow direction and rate (isometric graph);
- Point of compliance;
- Groundwater monitoring wells;

- The extent of any plume (horizontal and vertical);
- Hazardous waste management area; and
- Property boundary.

The following required information may be incorporated into the topographic map if possible, or at least should be discussed in the text:

- Boundaries of uppermost aquifer; and
- Underlying interconnect between uppermost aquifer and lower aquifer.

(Although many of these items can be shown on a single map, it is allowable to use additional maps to display some of the information. Presentation of all of this information on a single map may sacrifice clarity.)

E-5 Containment Plume Description: 40 CFR 270.14(c), (2), (4) and (7)(ii); Part 261, Appendix VIII

For existing facilities suspected of contaminating groundwater, provide a description of any plume of contamination that has entered the groundwater from a regulated unit at the time the application is submitted that:

- Delineates the extent of the plume on the topographic map of §270.14(b)(19);
- Identifies the concentration of each constituent listed in Appendix VIII of Part 261 throughout the plume or identifies the maximum concentrations of each Appendix VIII constituent in the plume; and
- Delineates the vertical extent of the plume in cross section.

This requirement is applicable to all existing facilities where interim status monitoring shows the presence of hazardous constituents downgradient from the regulated units, unless it can be proven that such constituents are coming from another source. In addition, this requirement may be applied to other existing facilities where interim status monitoring data are non-existent or deficient if these facilities are suspected of contaminating groundwater, or if the Regional Administrator determines that a facility's interim status monitoring program is incapable of determining whether hazardous constituents have entered the groundwater from a regulated unit.

NOTE: In some cases, contaminant plumes may be defined under groundwater quality assessment programs carried out during the interim status period as required by §265.93(d). Normally, such assessment programs do not address the complete list of Appendix VIII constituents as required under §270.14(c)(4). Additional monitoring will be required to identify the concentration of each Appendix VIII constituent in the plume.

E-6 General Monitoring Program Requirements: 40 CFR 270.14(c)(5), 264.97, 264.90(b)(4)

Provide detailed plans and an engineering report describing the proposed groundwater monitoring program to meet the general groundwater monitoring requirements. The following information is required:



E-6a      Description of Wells: 40 CFR 264.97(a), (b), (c)

- Number of wells;
- Locations;
- Depths;
- Materials of construction (casing, screens, etc.);
- Assurance of unaffected background groundwater measurement; and
- Assurance of compliance point groundwater measurement.

E-6b      Description of Sampling/Analysis Procedures: 40 CFR 264.97(d), (e), (f)

- Sample collection methods;
- Sample preservation/shipment;
- Analytical procedures;
- Chain-of-custody;
- Documentation of proper sampling and analysis procedures; and
- Procedure for determination of groundwater elevation with each sample.

Provide a complete Quality Assurance Project Plan (QAPjP) for the groundwater sampling and analysis plan. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

E-6c      Procedures for Establishing Background Quality: 40 CFR 264.97(a)(1), (g)

- Groundwater samples must be representative of background quality not affected by releases from the regulated unit;
- Background groundwater quality must be established for each monitoring parameter or constituent;
- Procedures for establishing background quality may include wells not hydraulically upgradient of the waste management area where:
  - upgradient cannot be determined due to hydrogeologic conditions,
  - other wells provide background groundwater quality that is representative or more representative of background than upgradient wells.

E-6d      Statistical Procedures: 40 CFR 264.97(h); (i)(1), (5) and (6)

Provide a description of the statistical procedures that will be used in evaluating groundwater monitoring data. The following statistical methods [E-6d(1) - (5)] have been approved by IDEM for use in evaluating groundwater monitoring data for each hazardous constituent. The description provided must demonstrate compliance with the following performance standards:

- Testing should be conducted separately from each hazardous constituent in each well;

- Method should be appropriate for distribution of chemical parameters or hazardous constituents. More than one method may be needed if distributions differ;
- Method must account for data below the detection limit;
- Any practical quantification limit (PQL) used in the method shall be the lowest concentration level within levels of precision and accuracy for routine lab operations; and
- Method shall include procedures to control or correct for seasonal and spatial variability and temporal correlation in data.

E-6d(1) Parametric Analysis of Variance (ANOVA): 40 CFR 264.97(h)(1), (i)(2)

ANOVA followed by multiple comparisons procedures:

- Include estimation and testing of contrasts between each compliance well's mean and the background mean levels for each constituent.
- If using individual well comparison procedure, Type 1 error level of no less than 0.01 shall be maintained. If using multiple comparison procedure, Type 1 error level no less than 0.05 for each testing period must be used.

E-6d(2) Non-parametric ANOVA (Based on Ranks): 40 CFR 264.97(h)(2), (i)(2)

ANOVA based on Ranks followed by multiple comparison procedures:

- Estimation and testing of each compliance well's median and background median levels for each constituent.
- If using individual well comparison procedures, Type 1 error level of no less than 0.01 shall be maintained. If using multiple comparison procedure, Type 1 error level no less than 0.05 for each testing period must be used.

E-6d(3) Tolerance or Predication Interval Procedure: 40 CFR 264.97(h)(3), (i)(4)

- Establish interval for each constituent based on distribution of background data;
- Compare level of each constituent in each compliance well to the upper tolerance or prediction limit; and
- Prepare levels of confidence and/or percentage of the population that the interval must contain considering number of samples in the background data base, data distribution, and range of concentration values for each constituent of concern.

E-6d(4) Control Chart Approach: 40 CFR 264.97(h)(4), (i)(3)

- Control limits for each constituent; and
- Specify type of control chart and associated parameter values.

E-6d(5) Alternative Approach: 40 CFR 264.97(h)(5), (i)

An alternative approach can be proposed that complies with all performance standards set in 264.97(i).

- E-7      Detection Monitoring Program: 40 CFR 270.14(c)(6), 264.91(a)(4), 264.98
- Provide sufficient information, supporting data, and analysis documenting the absence of hazardous constituents in the groundwater to support the implementation of a detection monitoring program at the present time.
- E-7a      Indicator Parameters, Waste Constituents, Reaction Products to be Monitored: 40 CFR 270.14(c)(6)(i), 264.98(a)
- Supply a list of indicator parameters, waste constituents, or reaction products that can provide a reliable indication of the presence of hazardous constituents in the groundwater. Provide the following information:
- Type, quantity, and concentrations of constituents expected in wastes managed at the regulated unit(s);
  - Mobility, stability, persistence of waste constituents, or their reaction products, expected in the unsaturated zone;
  - Detectability of indicator parameters, waste constituents, or their reaction products in the groundwater (including the expected method detection limits (MDLs) or practical quantitation limits (PQLs)); and
  - Concentrations or values and coefficients of variation of proposed parameters in the background groundwater.
- E-7b      Groundwater Monitoring System: 40 CFR 270.14(c)(6)(ii), 264.97(a)(2), (b), (c); 264.98(b)
- Describe the individual elements of the monitoring system to be used during detection monitoring. Identify the number, location, and depth of each well, and describe the well construction materials.
- E-7c      Background Groundwater Concentration Values for Proposed Parameters: 40 CFR 270.14(c)(6)(iii), 264.98(c), 264.97(g)(1), (2)
- Demonstrate that the following procedures will be used:
- Use of appropriate groundwater monitoring system, to establish background specifying number and type of samples for each hazardous constituent appropriate for the statistical test employed;
  - Sampling procedure shall be a sequence of at least four samples from each well in the entire system at an interval assuring an independent sample relative to the uppermost aquifer's effective porosity, hydraulic conductivity, hydraulic gradient and fate and transport characteristics of the potential contaminants but at least semi-annually; or
  - Alternative sampling procedure to be approved by the Regional Administrator.
- E-7d      Proposed Sampling and Analysis Procedures: 40 CFR 270.14(c)(6)(iv); 264.97(f); 264.98(d), (e), (f)

Provide a description of the proposed sampling and analysis procedures, including the following information:

- Documentation of proper sampling and analysis procedures;
- Procedures for determining groundwater elevation;
- Procedures for determining statistically significant increase for any monitored parameter;
- At least four samples from each compliance and background well semi-annually; and
- Procedure for annual determination of uppermost aquifer flow rate and direction.

Provide a complete Quality Assurance Project Plan (QAPjP) for the groundwater sampling and analysis plan of the detection monitoring program. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

E-7e      Statistically Significant Increase in Any Constituent or Parameter Identified at Any Compliance Point Monitoring Well: 40 CFR 264.98(g), 264, Appendix IX

Document that the following procedures will be implemented if there is statistically significant evidence of contamination for any constituent or parameter is at any compliance point monitoring well:

- Notify Regional Administrator of this finding in writing within seven (7) days;
- Immediately sample all wells for Appendix IX list (Part 264) constituents, and if necessary, resample within one month and repeat analysis for the those compounds detected;
- Submit a compliance monitoring plan meeting the requirements of 264.99 within 90 days;
- Submit engineering feasibility plan within 180 days for a corrective action program unless all constituents identified are listed in 264.94 Table 1 and their concentrations do not exceed respective values in that table or ACLs have been approved; and
- If appropriate, submit a demonstration that a source other than the regulated unit caused the contamination.

E-8      Compliance Monitoring Program: 40 CFR 270.14(c)(7), 264.99

If the presence of hazardous constituents has been detected in the groundwater at the point of compliance at the time of permit application, submit the following information.

E-8a      Description of Monitoring Program

E-8a(1)      Waste Description: 40 CFR 270.14(c)(7)(i)

Provide description of the wastes previously handled at the facility. This description must include:

- Historical records of volumes, types (including EPA ID number, if applicable), and chemical composite of wastes placed in units in the waste management area;
- The results of any direct sampling of the waste (see "Test Methods for the Evaluation of Solid Waste, Physical/Chemical Methods," SW-846);
- A list of constituents that are reasonably expected to be in or derived from the waste; and
- Identification of dominant constituents expected to be present, and their relative abundance.

If it is expected that some constituents may form a separate, immiscible fluid, the composition of this fluid and its viscosity and density must be included in the application.

E-8a(2) Characterization of Contaminated Groundwater: 40 CFR 270.14(c)(7)(ii)

Provide a characterization of the contaminated groundwater including the concentration of identified hazardous constituents. For each well at the point of compliance, and for each background well, provide the following information:

- Concentrations of each constituent in Appendix VIII of 40 CFR Part 261;
- Concentrations of major anions and cations; and
- Concentrations of the constituents listed in Table 1 of §264.94, if not already determined by the above.

E-8a(3) Hazardous Constituents to be Monitored in Compliance Program: 40 CFR 270.14(c)(7)(iii), 264.99(a)(1), 264.98(g)(3)

Specify the hazardous constituents for which the owner/operator to monitor and present a rationale for selecting these constituents. The owner/operator may resample within one month and repeat analysis for constituents detected. Constituents identified in both analyses will form basis for compliance monitoring plan.

E-8a(4) Concentration Limits: 40 CFR 270.14(c)(7)(iv), 264.99(a)(2), (c)(3); 264.94; 264.97(g), (h)

Specify proposed concentration limits for each hazardous constituent. (The proposed concentration limit must not exceed the value of that constituent, listed in Table 1 of §264.94, entitled Maximum Concentration of Constituents for Groundwater Protection or the present background level of that constituent in the groundwater; whatever is greater. If petitioning the Regional Administrator to establish alternate concentration limits, the owner/operator must supply the information identified in comment E-8a(5).) Specify conditions warranting special sampling procedures.

Describe procedures for establishing background concentration values for constituents that are based on:

- Use of any appropriate groundwater monitoring system;
- Data that is available prior to permit issuance;

- Data that accounts for measurement errors in sampling and analysis;
- Data that accounts for seasonal groundwater quality fluctuations; and
- Data from a minimum of four samples per well collected at least semi-annually during the compliance period.

E-8a(5) Alternate Concentration Limits: 40 CFR 270.14(c)(7)(iv), 264.99(a)(2), 264.94(b)

Provide a justification for establishing alternate concentration limits. This justification must address each of the following factors.

E-8a(5)(i) Adverse Effects on Groundwater Quality: 40 CFR 264.94(b)(1)

The potential adverse effects on groundwater quality, considering:

- The physical and chemical characteristics of the waste in the regulated unit, including its potential for migration;
- The hydrogeological characteristics of the facility and surrounding land;
- The quantity of groundwater and the direction of groundwater flow;
- The current and future uses of groundwater in the area;
- The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater quality;
- The potential for health risks caused by human exposure or wastes constituents;
- The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- The persistence and permanence of the potential adverse effects.

E-8a(5)(ii) Potential Adverse Effects: 40 CFR 264.94(b)(2)

The potential adverse effects on hydraulically-connected surface-water quality, considering:

- The volume and physical and chemical characteristics of the waste in the regulated unit;
- The hydrogeological characteristics of the facility and surrounding land;
- The quantity and quality of groundwater, and the direction of groundwater flow;
- The proximity of the regulated unit to surface waters;
- The current and future uses of surface waters in the area and any water quality standards established for those surface waters;
- The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality;
- The potential for health risks caused by human exposure to waste constituents;
- The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- The persistence and permanence of the potential adverse effects.

E-8a(6) Engineering Report Describing Groundwater Monitoring System: 40 CFR 270.14(c)(7)(v), 264.95, 264.97(a)(2) and (c), and 264.99(b)

Provide detailed plans and an engineering report discussing the individual elements of the monitoring system to be used during compliance monitoring. The plans should identify the number, location, and depth of each well, and describe the casing and construction materials of wells.

Provide details supporting the representative nature of the groundwater quality at (1) background monitoring points and (2) the compliance monitoring point.

E-8a(7) Proposed Sampling and Statistical Analysis Procedures for Groundwater Data: 40 CFR 270.14(c)(7)(vi), 264.97(d), (e), (f), 264.99(c), (d), (e), (f), and (g)

Provide the following information regarding proposed sampling and statistical analysis procedures for groundwater data:

- Compliance period;
- Sample collection methods;
- Sample preservation/shipment;
- Analytical procedures;
- Chain-of-custody control;
- Documentation of proper sampling and analysis procedures;
- Procedures for determining groundwater elevation;
- Procedures for annual determination of uppermost aquifer flow rate and direction; and
- Annual testing procedures for Appendix IX constituents.

Provide a description of procedures for determining a statistically significant increase for any monitored parameters or hazardous constituents, including the following:

- Comparing compliance point using the procedures in 264.97(h) to the concentration limit developed in accordance with 264.94; and
- Collecting at least four samples from each well (compliance and background) at least semi-annually.

Provide a complete Quality Assurance Project Plan (QAPjP) for the groundwater sampling and analysis plan of the compliance monitoring program. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

E-8a(8) Groundwater Protection Standard Exceeded at Compliance Point Monitoring Well: 40 CFR 264.99(h), (i)

Indicate that the following procedures will be implemented if the groundwater protection is exceeded at the compliance point monitoring well:

- Submit written notification to Regional Administrator;
- Submit an application for permit modification to establish a corrective action program meeting the requirements of 264.100 within 180 days, including details

of the program to comply with the groundwater protection standard and details of groundwater monitoring to demonstrate effectiveness of the corrective action program; or

- Submit demonstration that concentration limits were exceeded due to source other than regulated unit, or due to an error in sampling, analysis, statistical evaluation, or variation in the groundwater.

E-9      Corrective Action Program: 40 CFR 270.14(c)(8), 264.100, 264.99(l)

If hazardous constituents have been measured in the groundwater that exceed the concentration limits established under §264.94 Table 1, or if groundwater monitoring conducted at the time of permit application at the waste boundary indicates the presence of hazardous constituents from the facility in groundwater over background concentrations, the owner or operator must submit sufficient information, supporting data, and analyses to establish a corrective action program that meets the requirements of §264.100. (However, an owner or operator is not required to submit information to establish a corrective action program if he demonstrates to the Regional Administrator that alternate concentration limits will protect human health and the environment after considering the criteria listed in §264.94(b).)

Submit the following information to establish a corrective action program:

E-9a      Characterization of Contaminated Groundwater: 40 CFR 270.14(c)(8)(i)

Provide a characterization of the contaminated groundwater including the concentration of identified hazardous constituents. For each well at the point of compliance, and for each background well, provide the following information:

- Concentrations of each constituent in Appendix VIII of 40 CFR Part 261;
- Concentrations of major anions and cations; and
- Concentrations of the constituents listed in Table 1 of §264.94, if not already determined by the above.

E-9b      Concentration Limits: 40 CFR 270.14(c)(8)(ii), 264.99(a)(2), 264.94(b)

Specify proposed concentration limits for each hazardous constituent. (The proposed concentration limit must not exceed the present background level of that constituent in the groundwater nor may it exceed the value of that constituent, if listed in Table 1 of §264.94, entitled Maximum Concentrations of Constituents for Groundwater Protection. If you wish to petition the Regional Administrator to establish alternate concentration limits than those specified above you must supply the information identified in comment E-9c.)

E-9c      Alternate Concentration Limits: 40 CFR 270.14(c)(8)(ii), 264.99(a)(2), 264.94(b)

Provide justification for establishing alternate concentration limits. This justification must address each of the following factors:



E-9c(1) Adverse Effects on Groundwater Quality: 40 CFR 264.94(b)(1)

Potential adverse effects on groundwater quality, considering:

- The physical and chemical characteristics of the waste in the regulated unit, including its potential for migration;
- The hydrogeological characteristics of the facility and surrounding land;
- The quantity of groundwater and the direction of groundwater flow;
- The proximity and withdrawal rates of groundwater users;
- The current and future uses of groundwater in the area;
- The existing quality of groundwater, including other sources of contamination and their cumulative impact on the groundwater quality;
- The potential for health risks caused by human exposure or waste constituents;
- The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents; and
- The persistence and permanence of the potential adverse effects.

E-9c(2) Potential Adverse Effects: 40 CFR 264.94(b)(2)

Potential adverse effects on hydraulically-connected surface-water quality; considering:

- The volume and physical and chemical characteristics of the waste in the regulated unit;
- The hydrogeological characteristics of the facility and surrounding land;
- The quantity and quality of groundwater, and the direction of groundwater flow;
- The patterns of rainfall in the region;
- The proximity of the regulated unit to surface waters;
- The current and future uses of surface waters in the area and any water quality standards established for those surface waters;
- The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality;
- The potential for health risks caused by human exposure to waste constituents;
- The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;
- The persistence and permanence of the potential adverse effects.

E-9d Corrective Action Plan: 40 CFR 270.14(c)(8)(iii), 264.100(b)

A corrective action program must prevent hazardous constituents from exceeding their respective concentration limits at the compliance point, and between the compliance point and the downgradient facility property boundary.

Provide detailed plans and an engineering report on the corrective actions proposed for the facility. This information must include identification of the compliance point, a schedule for implementation for the corrective action measures, and the following:

E-9d(1) Location: 40 CFR 270.14(c)(8)(iii), 264.100(b)

Maps showing the location of engineered barriers, caps, drains and wells, etc. (use the topographic map in Section B-2).

E-9d(2) Construction Detail: 40 CFR 270.14(c)(8)(iii), 264.100(b)

Description and engineering drawings of construction details and specifications for any proposed features to contain groundwater or redirect its flow (e.g. engineering barriers, caps, drains, wells).

E-9d(3) Plans for Removing Wastes: 40 CFR 270.14(c)(8)(iii), 264.100(b)

If proposed, plans for removing and handling of any hazardous wastes.

E-9d(4) Treatment Technologies: 40 CFR 270.14(c)(8)(iii), 264.100(b)

A description of the treatment technologies to be used for contaminated groundwater that is pumped or drained from the zone of contamination.

E-9d(5) Effectiveness of Correction Program: 40 CFR 270.14(c)(8)(iv), 270.14(c)(8)(iii), 264.100(b)

A prediction and sensitivity analysis on the effectiveness of corrective actions. (For example, anticipated drain flow rates, assuming a range of hydrogeological properties.)

E-9d(6) Rejection System: 40 CFR 270.14(c)(8)(iii), 264.100(b)

If treated ground or surface water is to be reinjected at the site, the concentration levels of all hazardous constituents to be reinjected.

E-9d(7) Additional Hydrogeological Data: 40 CFR 270.14(c)(8)(iii), 264.100(b)

A description and summary of any additional hydrogeological data collected for use in designing the corrective action.

E-9d(8) Operation and Maintenance: 40 CFR 270.14(c)(8)(iii), 264.100(b)

Operation and maintenance plans for the correction action measures.

E-9d(9) Closure and Post-Closure Plans: 40 CFR 270.14(c)(8)(iii), 264.100(b)

If applicable, closure and post-closure care plans for the materials used to handle hazardous wastes as part of the corrective action.

E-9e Groundwater Monitoring Program: 40 CFR 270.14(c)(8)(iv), 264.100(d)

Provide a description of the groundwater monitoring program that must be implemented to determine compliance with the concentration limits established under 264.94, and to determine the effectiveness of the corrective action program. Water quality monitoring

must be conducted over the on-site extent of the contaminated groundwater. Submit the following information:

E-9e(1) Description of Monitoring System: 40 CFR 270.14(c)(7)(v), (8)

Provide a description of all elements of the groundwater monitoring system, including:

- Number of wells;
- Locations;
- Depths and screened intervals;
- Casing descriptions;
- Other well construction details; and
- Description of how the groundwater monitoring programs will demonstrate the adequacy of the corrective action.

E-9e(2) Description of Sampling and Analysis Procedures: 40 CFR 270.14(c)(7)(vi), (8)

Provide a description of all sampling and analysis procedures, including:

- Sampling frequency;
- Sampling collection;
- Sampling preservation and shipment;
- Analytical procedures;
- Chain-of-custody control;
- Procedures for determining groundwater elevations; and
- Procedures for annual determination of groundwater flow rate and direction.

Provide a complete Quality Assurance Project Plan (QAPjP) for the groundwater sampling and analysis plan of the corrective action program. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

E-9e(3) Monitoring Data and Statistical Analysis Procedures: 40 CFR 270.14(c)(7)(vi), (8)

Provide a description of all monitoring data and statistical analysis procedures, including:

- Procedure for establishing background concentration levels;
- Statistical procedures for comparing compliance point data to the concentration limits; and
- Statistical procedures for evaluating the effectiveness of the corrective action program between the compliance point and the property boundary.

E-9e(4) Reporting Requirements: 40 CFR 264.100(g)

Indicate that a semi-annual report will be submitted to the Regional Administrator evaluating the effectiveness of the corrective action program.

**F. PROCEDURES TO PREVENT HAZARDS**

F-1 Security: 40 CFR 264.14, 270.14(b)(4)

F-1a Security Procedures and Equipment: 40 CFR 270.14(b)(4), 264.14

Unless a waiver is granted, the facility must have either a 24-hour surveillance system or a barrier and a means to control entry.

F-1a(1) 24-Hour Surveillance System: 40 CFR 264.14(b)(1)

Demonstrate that the facility has a 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) that continuously monitors and controls entry onto the active portion of the facility; or

F-1a(2)(a) Barrier: 40 CFR 264.14(b)(2)(i)

Demonstrate that the facility has an artificial or natural barrier( e.g., a fence in good repair or a fence combined with a cliff), that completely surrounds the active portion of the facility; and

F-1a(2)(b) Means to Control Entry: 40 CFR 264.14(b)(ii)

A means to control entry, at all times, through the gates or other entrances to the active portion of the facility (e.g., an attendant, television monitors, locked entrance, or controlled roadway access to the facility).

F-1a(3) Warning Signs: 40 CFR 264.14(c)

The facility must have a sign with the legend, "Danger - Unauthorized Personnel Keep Out," that must be posted at each entrance to the active portion of the facility and at other locations, in sufficient numbers to be seen from any approach to this active portion. The legend must be written in English and in any other language predominant in the area surrounding the facility and must be legible from a distance of at least 25 feet. Existing signs with a legend other than "Danger - Unauthorized Personnel Keep Out" may be used if the legend on the sign indicates that only authorized personnel are allowed to enter the active portion, and that entry onto the active portion can be dangerous.

F-1b Waiver: 40 CFR 264.14(a)

If a waiver of the security procedures and equipment requirements is requested, the owner or operator must demonstrate the following:

F1b(1) Injury to Intruder: 40 CFR 264.14(a)(1)

Physical contact with the waste, structure, or equipment within the active portion of the facility will not injure unknowing or unauthorized persons or livestock that may enter the active portion of a facility; and

F-1b(2) Violation Caused by Intruder: 40 CFR 264.14(a)(2)

Disturbance of the waste or equipment by the unknowing or unauthorized entry of persons or livestock onto the active portion of a facility will not cause a violation of the requirements of this part.

F-2 Inspection Schedule: 40 CFR 264.15, 270.14(b)(5)

F-2a General Inspection Requirements: 40 CFR 270.14(b)(5), 264.15(a) and (b), 264.33

Describe the facility schedule for inspection of monitoring equipment, safety and emergency equipment, security devices, and operating and structural equipment that are vital to prevent, detect, or respond to environmental or human health hazards. The schedule must be kept at the facility.

F-2a(1) Types of Problems: 40 CFR 264.15(b)(3)

The schedule must identify the types of problems to look for during the inspection.

F-2a(2) Frequency of Inspections: 40 CFR 264.15(b)(4)

Describe the frequency of inspection for items on the schedule. The frequency of inspection should be based on the rate of possible deterioration of equipment and the probability of an environmental or human health incident if the deterioration, malfunction, or operator error goes undetected between inspections. Areas subject to spills, such as loading and unloading areas, and major features of the site (such as dikes, retention pond conditions, storage conditions, application rates and general site appearance) must be inspected daily when in use.

F-2b Specific Process Inspection Requirements: 40 CFR 270.14(b)(5), 264.15(b)(4)

F-2b(1) Container Inspection: 40 CFR 264.174

Demonstrate that the containers and the container storage area will be inspected weekly for leaks, spills and deterioration caused by corrosion or other factors.

F-2b(2) Tank System Inspection: 40 CFR 264.195

F-2b(2)(a) Tank System External Corrosion and Releases: 40 CFR 264.195(b)(1)

Demonstrate that the above-ground portions of the tank system are inspected daily to detect external corrosion or releases of waste.

F-2b(2)(b) Tank System Construction Materials and Surrounding Area: 40 CFR 264.195(b)(3)

Demonstrate that the construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) are inspected daily to detect erosion or signs of releases of hazardous waste (e.g., wet spots, dead vegetation).

F-2b(2)(c)     Tank System Overfilling Control Equipment: 40 CFR 264.195(a)

Develop a schedule and demonstrate that it will be followed for inspecting overfill controls.

F-2b(2)(d)     Tank System Monitoring and Leak Detection Equipment: 40 CFR 264.195(b)(2)

Demonstrate that data gathered from monitoring and leak detection equipment (e.g., pressure and temperature gauges monitoring wells), where present, is inspected daily to ensure that the tank is operated according to design specifications.

F-2b(2)(e)     Tank System Cathodic Protection: 40 CFR 264.195(c)

Demonstrate that the proper operation of the cathodic protection system (if present) for underground tanks is confirmed within six months after installation and at least annually thereafter. Demonstrate that all sources of impressed current are inspected and/or tested, as appropriate, at least bimonthly.

F-2b(3)     Waste Pile Inspection: 40 CFR 270.18(d), 264.254(b)

Describe how each waste pile, while in operation, will be inspected daily and after storms to detect evidence of any of the following:

F-2b(3)(a)     Run-on and Run-off Control System: 40 CFR 264.254(b)(1)

Deterioration, malfunctions, or improper operation of run-on and run-off control systems.

F-2b(3)(b)     Wind Dispersal System: 40 CFR 264.254(b)(2)

Proper functioning of wind dispersal control systems, where present.

F-2b(3)(c)     Leachate Collection and Removal System: 40 CFR 270.18(d), 264.254(b)(3), 264.254(c)

The presence of leachate in and proper functioning of the double liner system, and the leachate collection and removal systems.

Waste pile leak detection systems required under 264.251(c) or 264.251(d) must record the amount of liquids removed from each leak detection system at least one each week during the active life of the unit and during the closure period.

F-2b(4)     Surface Impoundment Inspection: 40 CFR 270.17(c), 264.226(b), 264.226(c)

Document inspection procedures for the following:

F-2b(4)(a) Condition Assessment: 40 CFR 264.226(b)

Describe how each surface impoundment, while in operation, will be inspected weekly and after storms to detect evidence of any of the following:

F-2b(4)(a)(1) Overtopping Control System: 40 CFR 264.226(b)(1)

Deterioration, malfunctions, or improper operation of overtopping control system.

F-2b(4)(a)(2) Impoundments Contents: 40 CFR 264.226(b)(2)

Sudden drop in the level of the impoundment contents.

F-2b(4)(a)(3) Dikes and Containment Devices: 40 CFR 264.226(b)(3)

Severe erosion or other signs of deterioration in dikes or other containment devices.

F-2b(4)(b) Structural Integrity: 40 CFR 264.226(c)

Specify the procedure to be followed for assessing the structural integrity of the surface impoundment dike, including that portion of any dike that provides freeboard. Prior to issuance of the permit, and after any extended period of time during which the impoundment was not in service, the owner or operator must obtain a certification from a qualified engineer. The certification must establish that the dikes will withstand the stress of the pressure exerted by the types and amount of wastes to be placed in the impoundment and will not fail due to scouring or piping without dependence on any liner system included in the surface impoundment construction.

F-2b(4)(c) Leak Detection System: 40 CFR 270.17(c), 264.226(d)

Describe how the double liner system and leak detection system will be inspected.

Surface impoundment leak detection system required under 264.221(c) or 264.221(d) must record the amount of liquids removed from each leak detection system at least one each week during the active life of the unit and during the closure period.

F-2b(5)(a) Incinerator and Associated Equipment: 40 CFR 264.347(b)

Describe the procedures for daily visual inspections of the incinerator and associated equipment for leaks, spills, fugitive emissions, and signs of tampering.

F-2b(5)(b) Incinerator Waste Feed Cut-Off System and Associated Alarms: 40 CFR 264.347(c)

Describe the procedures for testing the emergency waste feed cut-off system and associated alarms. Testing must be conducted on a weekly basis unless a demonstration can be made that the weekly frequency is unduly restrictive and that less frequent

inspections will be adequate. At a minimum, operational testing must be conducted monthly.

F-2b(6) Landfill Inspection: 40 CFR 264.303(b)

Demonstrate that while the landfill is in operation it will be inspected weekly and after storms to detect evidence of any of the following:

F-2b(6)(a) Run-on and Run-off Control System: 40 CFR 264.303(b)(1)

Deterioration, malfunctions, or improper operation of run-on and run-off control system.

F-2b(6)(b) Wind Dispersal Control System: 40 CFR 264.303(b)(2)

Proper functioning of wind dispersal control systems, where present.

F-2b(6)(c) Leachate Collection and Removal System: 40 CFR 264.303(b)(3), 264.303(c)

The presence of leachate in and proper functioning of the double liner system, and leachate collection and removal systems.

Landfill leak detection systems required under 264.301(c) or 264.301(d) must record the amount of liquids removed from each leak detection system at least one each week during the active life of the unit and during the closure period.

F-2b(7) Land Treatment Facility Inspection: 40 CFR 264.273(g)

Describe how the land treatment facility units will be inspected weekly and after storms to detect evidence of the following:

F-2b(7)(a) Run-on and Run-off Control System: 40 CFR 264.273(g)(1)

Deterioration, malfunctions, or improper operation of run-on and run-off control systems.

F-2b(7)(b) Wind Dispersal Control System: 40 CFR 264.273(g)(2)

Improper functioning of wind dispersal control measures.

F-2b(8) Miscellaneous Unit Inspections: 40 CFR 270.14(b)(5), 264.602

Provide an inspection program that ensures compliance with the standards specified in D-8.

F-2b(9) Boilers and Industrial Furnaces (BIF) Inspections: 40 CFR 264.15, 266.102(a)(2)(ii), 266.102(e)(8), 266.111(e)(3)



Demonstrate that the BIF will be subject to thorough visual inspections when it contains hazardous waste (at least daily) for signs of leaks, spills, fugitive emissions, and tampering.

Automatic waste feed cut-off systems must be tested at least once every 7 days when hazardous waste is burned, unless the applicant demonstrates that weekly inspection unduly upset operations. Minimum, testing must be conducted once every 30 days. A description of automatic feed cut-off system testing procedures must be included.

Demonstrate that the owner/operator will inspect direct transfer areas at least once each operating hour when hazardous waste is being transferred from the transport vehicle (or container) to the BIF.

F-2b(10) Containment Building Inspection: 40 CFR 264.1101(c)(3), 264.1101(c)(4)

Demonstrate the owner/operator will inspect, at least every seven days, all monitoring equipment, leak detection equipment, the containment building, and the area immediately surrounding the containment building for evidence of release of hazardous waste. This information must be recorded in the facility's operating record.

F-3 Waiver of Documentation of Preparedness and Prevention Requirements: 40 CFR 270.14(b), 264.32(a) through 264.32(d)

F-3a Equipment Requirements: 40 CFR 270.14(b), 264.32

All facilities must be equipped with the following, unless it can be demonstrated that none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below:

F-3a(1) Internal Communications: 40 CFR 264.32(a)

Describe the internal communications or alarm system used to provide immediate emergency instruction (voice or signal) to facility personnel.

F-3a(2) External Communications: 40 CFR 264.32(b)

Describe the device, such as a telephone (immediately available at the scene of operations) or a hand held two-way radio, for summoning emergency assistance from local police departments, fire departments, or state or local emergency response teams.

F-3a(3) Emergency Equipment: 40 CFR 264.32(c)

Demonstrate that portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment are available at the facility.

F-3a(4) Water for Fire Control: 40 CFR 264.32(d)

Demonstrate that the facility has water at adequate volume and pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems.

F-3b Aisle space Requirements: 40 CFR 264.35

Demonstrate that the facility maintains sufficient aisle space to allow the unobstructed movement of personnel, fire protection equipment, or spill control equipment to any area of facility operation in an emergency. Requests for a waiver of the aisle space requirements must be accompanied by a demonstration that aisle space is not needed for any, or all, of these purposes.

F-4 Preventive Procedures, Structures, and Equipment: 40 CFR 270.14(b)(8)

F-4a Unloading Operations: 40 CFR 270.14(b)(8)(i)

Describe the procedures, structures, or equipment used to prevent hazards in unloading operations (e.g., use of ramps or special forklifts).

F-4b Run-off: 40 CFR 270.14(b)(8)(ii)

Describe the procedures, structures or equipment used to prevent run-off from hazardous waste handling areas to other areas of the facility or environment, or prevention of flooding (e.g., berms, dikes, trenches).

F-4c Water Supplies: 40 CFR 270.14(b)(8)(iii)

Describe procedures, structures, or equipment to prevent contamination of water supplies.

F-4d Equipment and Power Failure: 40 CFR 270.14(b)(8)(iv)

Describe the procedures, structures, or equipment used to mitigate the effects of equipment failure and power outage.

F-4e Personnel Protective Equipment: 40 CFR 270.14(b)(8)(v)

Describe the procedures, structures, or equipment used to prevent undue exposure of personnel to hazardous waste (e.g., protective clothing).

F-5 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste: 40 CFR 270.14(b)(9)

F-5a Precaution to Prevent Ignition or Reaction of Ignitable or Reactive Waste: 40 CFR 270.14(b)(9), 264.17(a)

Describe the precautions taken by a facility that handles ignitable or reactive waste to prevent actual ignition, including separation from sources of ignition such as open flames, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static,

electrical, or mechanical), spontaneous ignition (e.g., heat-producing chemical reaction), and radiant heat. Demonstrate that when ignitable or reactive waste is being handled, the owner or operator confines smoking and open flames to specially designated locations. "NO SMOKING" signs must be conspicuously placed wherever a hazard exists from ignitable or reactive waste.

F-5b General Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste: 40 CFR 270.14(b)(9), 264.17(b)

Describe the precautions taken by a facility that treats, stores, or disposes of ignitable or reactive waste, or accidentally mixes incompatible waste or incompatible wastes and other materials, to prevent reactions that: (1) generate extreme heat of pressure, fire or explosions, or violent reactions; (2) produce uncontrolled flammable fumes, dusts, or gases in sufficient quantities to threaten human health or the environment; (3) produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; (4) damage the structural integrity of the device or facility; (5) by similar means threaten human health or the environment.

F-5c Management of Ignitable or Reactive Wastes in Containers: 40 CFR 270.15(c), 264.176

Provide sketches, drawings, or data demonstrating that containers of ignitable or reactive waste are located at least 15 meters (50 feet) from the facility's property line.

F-5d Management of Incompatible Wastes in Containers: 40 CFR 270.15(d), 264.177

Describe the procedures used to ensure that incompatible wastes and materials are not placed in the same containers or in unwashed containers that previously held incompatible waste. If a storage container holds a hazardous waste that is incompatible with any waste or other materials stored nearby in other containers, piles, open tanks, or surface impoundments, document that the wastes are separated from other materials or protected from them by a dike, wall or other device.

F-5e Management of Ignitable or Reactive Wastes in Tank Systems: 40 CFR 270.16(j), 264.198

Describe the operational procedures used for storing such wastes in tank systems that includes specific information on: (1) how the waste is treated, rendered, or mixed before or immediately after the placement in the tank so that it is no longer considered ignitable or reactive and complies with §264.17(b); or the waste is stored or treated in such a way that it is protected from any material or conditions that may cause the waste to react or ignite; or the tank is used solely for emergencies; (2) how facilities that treat or store ignitable or reactive waste in tanks maintain protective distance between the tank(s) and any public ways, streets, alleys, or adjoining property lines then can be built upon as required in Tables 2-1 through 2-6 of the National Fire Protection Association's "Flammable and Combustible Liquids Code."

F-5f Management of Incompatible Wastes in Tank Systems: 40 CFR 270.16(j), 264.199

Demonstrate that incompatible wastes and materials are not stored in the same tank or in an unwashed tank that previously held an incompatible waste or material unless §264.17(b) is complied with.

F-5g      Management of Ignitable or Reactive Wastes Placed in Waste Piles: 40 CFR 270.18(g), 264.256

If ignitable or reactive wastes are to be placed in the waste pile, provide a description of how the wastes will be mixed, treated or otherwise rendered nonignitable and/or nonreactive. Alternately, describe the procedures for managing the waste in such a way that it is protected from any material or conditions that may cause it to ignite or react.

F-5h      Management of Incompatible Wastes Placed in Waste Piles: 40 CFR 270.18(h) 264.257

If a pile of hazardous waste is incompatible with any waste or other material stored nearby in containers, other piles, open tanks, surface impoundments, document that the waste pile is separated from these other materials, or protected from them, by means of a dike, berm, wall, or other device. Demonstrate that hazardous wastes and materials will not be piled on the same base where incompatible wastes or materials were previously piled, unless 264.17(b) is complied with.

F-5i      Management of Ignitable or Reactive Wastes Placed in Surface Impoundments: 40 CFR 270.17(h), 264.229

Except for surface impoundments to be used solely for emergencies, if ignitable or reactive wastes are to be placed in the surface impoundment, provide a description of how the wastes will be mixed, treated, or otherwise rendered non-ignitable and/or reactive. Alternately, describe the procedures for managing the waste in such a way that it is protected from any material or conditions that may cause it to ignite or react.

F-5j      Management of Incompatible Wastes Placed in Surface Impoundments: 40 CFR 270.17(h), 264.230

If incompatible wastes, or incompatible wastes and materials are to be placed in the surface impoundment, provide a demonstration that such activities will not:

- Generate extreme heat or pressure, fire, explosions, or violent reactions;
- Produce uncontrolled toxic or flammable emissions in significant quantities;
- Damage the unit's structural integrity; or
- Otherwise threaten human health or the environment.

This demonstration must be thoroughly documented.

F-5k      Management of Ignitable or Reactive Wastes Placed in Landfills: 40 CFR 270.21(f), 264.312

If ignitable or reactive wastes are to be placed in the landfill, provide a description of how the wastes will be mixed, treated or otherwise rendered nonignitable and/or

nonreactive. Alternately, describe the procedure for managing the waste in such a way that it is protected from any material or conditions that may cause it to ignite or react.

F-5l Management of Incompatible Wastes Placed in Landfills: 40 CFR 270.21(g), 264.313

If incompatible wastes, or incompatible wastes and materials are to be placed in the landfill, provide a demonstration that such activities will not:

- Generate extreme heat or pressure, fire, explosions, or violent reactions;
- Produce uncontrolled toxic or flammable emissions in significant quantities;
- Damage the unit's structural integrity; or
- Otherwise threaten human health or the environment.

This demonstration must be thoroughly documented.

F-5m Management of Ignitable or Reactive Wastes Placed in Land Treatment Units: 40 CFR 270.20(g), 264.281

If ignitable or reactive wastes are to be placed in the land treatment unit, provide a description of how the wastes will be mixed, treated or otherwise rendered nonignitable and/or nonreactive. Alternately, describe the procedures for managing the wastes in such a way that it is protected from any material or conditions that may cause it to ignite or react.

F-5n Management of Incompatible Wastes Placed in Land Treatment Units: 40 CFR 270.20(h), 264.282

If incompatible wastes, or incompatible wastes and materials are to be placed in the land treatment unit, provide a demonstration that such activities will not:

- Generate extreme heat, or pressure, fire, explosions, or violent reactions;
- Produce uncontrolled toxic or flammable emissions in significant quantities;
- Damage the unit's structural integrity; or
- Otherwise threaten human health or the environment.

This demonstration must thoroughly documented.

F-5o Management of Incompatible Wastes in Containment Buildings: 40 CFR 264.1101(a)(3)

If incompatible wastes or treatment reagents will be placed in the unit or its secondary containment system, describe procedures to ensure that the incompatible wastes will not cause the unit or secondary containment system to leak, corrode, or otherwise fail.

**G. CONTINGENCY PLAN:** 40 CFR 270.14(b)(7), 264.50 through 264.56, 264.52(b)

Provide a copy of the Contingency Plan or Spill Prevention Control and Countermeasures (SPCC) Plan amended for hazardous waste management to describe the actions facility personnel will take in response to fires, explosions, or any unplanned sudden or nonsudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water at the facility.

G-1 General Information:

Provide the facility name and location, operator, site plan, and description of facility operations.

G-2 Emergency Coordinators: 40 CFR 264.52(d), 264.55

Provide names, address, office and home phone numbers, and duties of primary and alternate coordinators and statement of authorization of coordinator to commit necessary resources to plan.

G-3 Implementation: 40 CFR 264.52(a), 264.56(d), 329 IAC 3.1-9-2(3)

Describe how and when the contingency plan will be implemented.

G-4 Emergency Actions: 40 CFR 264.56

G-4a Notification: 40 CFR 264.56(a)

Describe the methodology for immediate notification of facility personnel and necessary state or local agencies.

G-4b Identification of Hazardous Materials: 40 CFR 264.56(b)

Describe procedures for identification of hazardous materials involved in the emergency.

G-4c Assessment: 40 CFR 264.56(c), 264.56(d), 329 IAC 3.1-9-2(3)

Describe the criteria used to assess the possible hazards to human health and the environment as a result of a fire, release, or explosion, and the need for evacuation and notification of authorities. The authorities to be notified should include the on-scene coordinator for that area or the National Response Center.

G-4d Control Procedures: 40 CFR 264.52(a)

Specify control procedures to be taken in the event of a fire, explosion, or release.

G-4e Prevention of Recurrence or Spread of Fires, Explosions, or Releases: 40 CFR 264.56(e)

Describe the necessary steps to be taken to ensure that fires, explosions, or releases do not occur, recur or spread to other hazardous waste at the facility.

- G-4f      Storage and Treatment of Released Material: 40 CFR 264.56(g)
- Provide for treatment, storage, or disposal of any material that results from a release, fire, or explosion at the facility.
- G-4g      Incompatible Waste: 40 CFR 264.56(h)(1)
- Describe provisions for prevention of incompatible waste from being treated, stored, or located in the affected areas until clean-up procedures are completed.
- G-4h      Post-Emergency Equipment Maintenance: 40 CFR 264.56(h)(2)
- Describe procedures for ensuring that all emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed.
- G-4i      Container Spills and Leakage: 40 CFR 264.52, 264.171
- Specify procedures to be used when responding to container spills or leakage, including procedures and timing for expeditious removal of spilled waste and repair or replacement of the container(s).
- G-4j      Tank Spills and Leakage
- G-4j(1)      Stopping Waste Addition: 40 CFR 264.196(a)
- For a tank system or secondary containment system from which there has been a leak or spill, or that is unfit for use, document that the owner or operator will immediately stop the flow of hazardous waste into the tank system or secondary containment system and inspect the system to determine the cause of the release.
- G-4j(2)      Removing Waste: 40 CFR 264.196(b)
- Specify that if the release was from the tank system, the owner/operator will, within 24-hours after detection of the leak, or if the owner/operator demonstrates that is not possible, at the earliest practicable time, remove as much of the waste as is necessary to prevent further releases of hazardous waste to the environment and to allow inspection and repair of the tank system to be performed. If the material released was to a secondary containment system, specify that all released materials will be removed within 24 hours or in as timely manner as is possible to prevent harm to human health and the environment.
- G-4j(3)      Containment of Visible Releases: 40 CFR 264.196(c)
- Specify that a visual inspection of the release will immediately be conducted. Demonstrate that based on the visual inspection, further migration of the leak or spill to soils and surface water will be prevented. Indicate that any visible contamination of the soil or surface water will be removed and properly disposed.

G-4j(4)      Notifications, Reports: 40 CFR 264.196(d)

Demonstrate that any release to the environment (except a leak or spill that is less than or equal to one pound and immediately contained and cleaned up) will be reported to the Commissioner within 24 hours of its detection.

G-4j(5)      Provision of Secondary Containment, Repair, or Closure: 40 CFR 264.196(e)

If the release has not damaged the integrity of the system, demonstrate that the released waste will be removed and repairs, if necessary, will be made, prior to returning the system to service.

If the cause of the release is a leak from the primary tank system into the secondary containment system, demonstrate that the primary tank system will be repaired before returning it to service.

If the source of the release is a leak to the environment from a component of a tank system without secondary containment, demonstrate that secondary containment (satisfying 264.193) will be provided for the component from which the leak occurred, unless the component is an aboveground portion of a tank system that can be inspected visually. If the source is an aboveground component that can be inspected visually, demonstrate that the system will not be returned to service without a certification by an independent, qualified, registered, professional engineer [in accordance with 270.11(d)] that the repaired system is capable of handling hazardous wastes without release for the intended life of the system. If a component is replaced to comply with the requirements of the subparagraph, demonstrate that the component will satisfy the requirements for new tank system or components in 264.192 and 264.193. Additionally if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an in ground or onground tank) demonstrate that the entire component will be provided with secondary containment in accordance with Section 264.193 prior to being returned to use.

G-4k      Surface Impoundment Spills and Leakage: 40 CFR 264.227

G-4k(1)      Emergency Repairs: 40 CFR 264.227

Describe the procedures to be used for removing a surface impoundment from service when the level of the liquid in the impoundment suddenly drops and the drop is not known to be caused by changes in the flow into or out of the impoundment or when the dike leaks. Address the following:

G-4k(1)(a)      Stopping Waste Addition: 40 CFR 264.227(b)(1)

Procedures for stopping waste additions to the impoundment.

G-4k(1)(b)      Containing Leaks: 40 CFR 264.227(b)(2)

Procedures for containing any leakage.



- G-4k(1)(c)     Stopping Leaks: 40 CFR 264.227(b)(3)
- Procedures for stopping the leak.
- G-4k(1)(d)     Preventing Catastrophic Failure: 40 CFR 264.227(b)(4)
- Procedures to stop or prevent catastrophic failure.
- G-4k(1)(e)     Emptying the Impoundment: 40 CFR 264.227(b)(5)
- Procedures for emptying the impoundment, if necessary.
- G-4k(2)     Certification: 40 CFR 264.227(d)(1), 264.226(c)
- Specify the procedure that will be followed for recertifying the dike's structural integrity, in the event the impoundment is removed from service as a result of actual or imminent dike failure.
- G-4k(3)     Repairs as a Result of Sudden Drop: 40 CFR 264.227(d)(2)
- Specify the procedure that will be followed in the event the impoundment is removed from service as a result of a sudden drop in the liquid level for the following:
- G-4k(3)(a)     Existing Portions of Surface Impoundment: 40 CFR 264.227(d)(2)(i)
- Installation of a liner for any existing portion of the impoundment.
- G-4k(3)(b)     Other Portions of the Surface Impoundment: 40 CFR 264.227(d)(2)(ii)
- Certification by a qualified engineer for other than existing portions of the impoundment.
- G-4l     Containment Building Leaks: 40 CFR 264.1101(c)(3)
- G-4l(1)     Repair of Containment Building: 40 CFR 264.1101(c)(3)
- Any condition that could lead to or has caused a release of hazardous waste must be promptly repaired in accordance with the following:
- Enter the record of discovery in the facility operating record;
  - Immediately remove from service that portion of the containment building affected by the condition;
  - Determine what steps must be taken to repair the unit, remove leakage from the secondary collection system, and establish a schedule for cleanup and repair;
  - Notify the Regional Administrator of the condition within 7 days of the discovery, and provide a written plan and schedule describing repair procedures within 14 days of discovery; and

- Indicate that the containment building will be completely or partially removed from service if required by the Regional Administrator.

G-4l(2) Certification Following Repair: 40 CFR 264.1101(c)(3)(iii)

Indicate that upon completion of all repairs and cleanup, the owner/operator will notify the Regional Administrator and provide a written verification, signed by a qualified registered professional engineer, that all repairs and cleanup has been completed in accordance with the written repair workplan.

G-5 Emergency Equipment: 40 CFR 264.52(e)

Describe the location and specifications of the emergency equipment.

G-6 Coordination Agreements: 40 CFR 264.52(c), 264.37

Describe the coordination agreements with local police and fire departments, hospitals, contractors, and state and local emergency response teams to familiarize them with the facility and actions needed in case of emergency. Document refusal to enter into a coordination agreement.

G-7 Evacuation Plan: 40 CFR 264.52(f)

Describe signal(s) to be used to begin evacuation routes, and planned and alternate evacuation routes.

G-8 Required Reports: 40 CFR 264.56(j), 329 IAC 3.1-9-2(4)

Describe the provisions for submission of reports of emergency incidents within 15 days of occurrence, and maintenance of records identifying the time, date, and details of an emergency incident.

**H. PERSONNEL TRAINING:** 40 CFR 270.14(b)(12), 264.16

H-1 Outline of the Training Program: 40 CFR 264.16(a)(1)

Provide an outline of both the introductory and continuing training programs by owners or operators to prepare personnel to operate or maintain the facility in a safe manner. Include a brief description on how training will be designed to meet actual job tasks.

Note: On-the-job training may be used to comply with these requirements.

H-1a Job Title/Job Description: 40 CFR 264.16(d)(1), 264.16(d)(2)

Provide the job title and job description of each employee whose position at the facility is related to hazardous waste management.

- H-1b      Training Content, Frequency, and Techniques: 40 CFR 264.16(c) and (d)(3)
- Describe the content, frequency, and techniques used in both introductory and continuing training (including an annual review of the initial training) for each employee.
- H-1c      Training Director: 40 CFR 264.16(a)(2)
- Demonstrate that the program is directed by a person trained in hazardous waste management.
- H-1d      Relevance of Training to Job Position: 40 CFR 264.16(a)(2)
- Demonstrate that facility personnel are instructed in hazardous waste management procedures (including contingency plan implementation) relevant to their positions.
- H-1e      Training for Emergency Response: 40 CFR 264.16(a)(3)
- Demonstrate that facility personnel are able to respond effectively to emergencies and are familiar with emergency procedures, emergency equipment, and emergency system. The training program should include the following, if applicable:
- Procedures for Using, Inspecting, Repairing, and Replacing Facility Emergency and Monitoring Equipment;
  - Key Parameters for Automatic Waste Feed Cut-off Systems;
  - Communications or Alarm Systems;
  - Response to Fires;
  - Response to Groundwater Contamination Incidents; and
  - Shutdown of Operations.
- H-2      Implementation of Training Program: 40 CFR 264.16(b), (d)(4) and (e)
- Indicate that training has been successfully completed by facility personnel within six months of their employment or assignment to the facility or transfer to a new position within the facility, whichever is later. Employees hired after the effective date of these regulations must not work in unsupervised positions until they have completed the training requirements. Records documenting that the required training has been given to and completed by facility personnel must be maintained.
- I.      CLOSURE PLANS, POST-CLOSURE PLANS, AND FINANCIAL REQUIREMENTS:** 40 CFR 270.14(b)(13) and (15) through (18), 264.110 through 264.120, 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, and 264.351 and 329 IAC 3.1-15
- I-1      Closure Plans: 40 CFR 270.14(b)(13), 264.112(a)(1) and (2)

Include a copy of a written closure plan consistent with I-1a through I-1g as applicable. The plan must include a description of how each hazardous waste management unit will be closed and a description of how final facility closure will be conducted. Describe the maximum extent of operations that will be left unclosed during the active life of the facility. Include maps of the facility and each unit to be closed.

Guidance for developing a Closure Plan may be found in IDEM's "Hazardous Waste Management Unit Closure Guidance".

I-1a      Closure Performance Standard: 40 CFR 264.111

Describe how closure:

- Minimizes the need for further maintenance;
- Controls, minimizes, or eliminates the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and
- Complies with the closure requirements of 40 CFR 264 Subpart G and unit-specific closure requirements.

I-1b      Partial Closure and Final Closure Activities: 40 CFR 264.112(b)(1) through 264.112(b)(7)

Describe the time and all activities required for:

- Partial closure, if applicable;
- Final closure; and
- Maximum extent of operation that will be active during life of facility.

This description must identify how requirements of 264.111, 264.113, 264.114, 264.115 and applicable requirements of 264.178, 264.197, 264.228, 264.258, 264.280, 264.310, and 264.351 will be met.

I-1c      Maximum Waste Inventory: 40 CFR 264.112(b)(3)

Describe the maximum inventory of hazardous wastes that could be in storage, treatment, and disposal at any time during the active life of the facility. Provide a list of hazardous wastes managed at the facility and include their EPA hazardous waste code(s). Describe the sequence in which units will be operated during the active life of the facility, and the order in which they will be closed.

I-1d      Schedule for Closure: 40 CFR 264.112(b)(6)

Provide a schedule for closure of each hazardous waste management unit and for final closure of the facility. The schedule must include the total time required to close each hazardous waste management unit and the time required for intervening closure activities. This will allow tracking of the progress of closure.

For facilities that use trust funds to establish financial assurance under 264.143 or 264.145, and that are expected to close prior to the expiration of the permit, provide an estimate of the expected year of final closure.

I-1(d)(1) Time Allowed for Closure: 40 CFR 264.112(b)(2), 264.113(a) and (b)

The schedule for closure must show:

- All hazardous wastes will be treated, removed off-site, or disposed of on-site within 90 days from receipt of the final volume of waste at the unit or facility; and
- All closure activities will be completed within 180 days from receipt of the final volume of waste at the unit or facility.

I-1d(1)(a) Extension for Closure Time: 40 CFR 264.113(a) and (b)

If the planned closure is expected to exceed the 90 days for treatment, removal or disposal of wastes and/or the 180 days for completion of closure activities, submit a petition for a schedule for closure that justifies that a longer period of closure time is required.

One of the following must be demonstrated:

- Closure activities require longer than 90 or 180 days;
- Unit or facility has capacity to receive additional wastes;
- There is a reasonable likelihood that another person other than owner or operator will recommence operation of the site within one year; and
- Closure would be incompatible with continued operation.

Demonstrate that all steps have and will be taken to prevent threats to human health and environment from the unclosed but inactive facility.

I-1e Closure Procedures: 40 CFR 264.112, 264.114

I-1e(1) Inventory Removal: 40 CFR 264.112(b)(3)

Discuss methods for removing, transporting, treating, storing or disposing of all hazardous wastes and identify the type(s) of off-site hazardous waste management units to be used.

I-1e(2) Disposal or Decontamination of Equipment, Structures, and Soils: 40 CFR 264.112(b)(4), 264.114

Associated with the closure of each hazardous waste management unit, provide a detailed description of the steps needed to decontaminate or dispose of all facility equipment and structures. The following must be included:

- List of equipment, structures, and soils;

- Decontamination procedures;
- Criteria for determining decontamination;
- Disposal of contaminated soil and residues;
- Decontamination of clean-up materials and equipment;
- Sampling procedures;
- Analytical methods and their expected practical quantitation limits; and
- Demonstration that decontamination has been effective.

Demonstrate that any hazardous constituents (i.e., 40 CFR 261 Appendix VIII) left at the unit will not impact any environmental media in excess of Agency-established exposure levels and that direct contact will not pose a threat to human health and the environment (see Preamble 51 FR 16444, May 2, 1986.)

Provide a complete Quality Assurance Project Plan (QAPjP) for the Closure Plan. Guidelines for developing the QAPjP are found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (SW-846), Chapter One.

Indicate that analytical results submitted to the IDEM will include the reportables listed in IDEM's "Hazardous Waste Management Unit Closure Guidance."

I-1e(3) Closure of Disposal Units/Contingent Closures: 40 CFR 270.14(b)(13), 270.17(f), 270.18(h), 270.21(e), 264.228(a)(2), 264.228(c)(1)(i), 264.258(c), 264.258(c)(1)(i), 264.310(a), 264.601

Closure plans for all waste piles, landfills, surface impoundments, and miscellaneous units in which wastes or contaminated materials are to remain at closure must describe how the unit will be closed, including a description of the final cover to be established and its expected performance. Contingent closure plans for tanks, surface impoundments, and waste piles also must provide these descriptions.

I-1e(3)(a) Disposal Impoundments: 40 CFR 264.228(a)(2)

If wastes are to remain in the impoundments after closure, describe the methods for preparing the wastes for the final cover.

I-1e(3)(a)(i) Elimination of Liquids: 40 CFR 264.228(a)(2)(i)

Describe how free liquids are to be removed or solidified at closure.

I-1e(3)(a)(ii) Waste Stabilization: 40 CFR 264.228(a)(2)(ii)

Describe the methods to be used to stabilize remaining wastes to support the final cover, including:

- Stabilization methods, equipment and materials;
- Required bearing strength of stabilization waste;
- Demonstration of stabilized waste bearing strength; and
- Methods for bearing strength determination during closure.

I-1e(3)(b) Cover Design: 40 CFR 264.228(a)(2)(iii), 264.310(a)

The cover design and installation procedures must be thoroughly described. This submission must include:

- Drawings showing layers, thickness, slopes and overall dimensions;
- The common name, species and variety of the proposed cover crop;
- Descriptions of synthetic liners to be used, including chemical properties, strength thickness and manufacturers specifications;
- Description of rationale for cover selection;
- Description of and specifications for protective materials placed above and below synthetic liners;
- Clay liner characteristics, including thickness and permeability; and
- Clay liner construction plans including lift sequencing.

I-1e(3)(c) Minimization of Liquid Migration: 40 CFR 264.228(a)(2)(iii)(A), 264.310(a)(1)

Describe the methods that will be provided for long-term minimization of the migration of liquids through the closed unit.

The Draft RCRA Guidance Document entitled Landfill Design--Liner Systems and Final Cover (1982), suggests the following design for landfill cover systems (from top to bottom):

- A vegetated top cover, with a minimum of 24 inches of topsoil;
- A middle drainage layer (at least one foot thick with a saturated conductivity of not less than  $1 \times 10^{-3}$  cm/sec) overlain by a geotextile filter fabric or graded granular filter; and
- A low permeability bottom layer consisting of two components:
  - an upper component of at least a 20 mil synthetic membrane protected above and below by at least six inches of bedding material,
  - a lower component of at least 24 inches of low permeability (maximum hydraulic conductivity of  $1 \times 10^{-7}$  cm/sec) soil emplaced in lifts not exceeding six inches.

For cover designs different than IDEM-recommended designs, provide engineering calculations showing the proposed cover will provide long-term minimization of liquid migration through the cover.

I-1e(3)(d) Maintenance Needs: 40 CFR 264.228(a)(2)(iii)(B), 264.310(a)(2)

Demonstrate that the cover system will function effectively with minimum maintenance needs.

I-1e(3)(e) Drainage and Erosion: 40 CFR 264.228(a)(2)(iii)(C), 264.310(a)(3)

Describe the procedures to be taken to promote drainage and minimize erosion or abrasion of the final cover. The following information should be provided:

- Data demonstrating that the proposed final slopes will not cause significant cover erosion;
- Description of drainage materials and their permeabilities;
- Engineering calculations demonstrating free drainage of precipitation off of and out of the cover; and
- Estimation of the potential for drainage-layer clogging.

I-1e(3)(f) Settlement and Subsidence: 40 CFR 264.228(a)(2)(iii)(D), 264.310(a)(4)

Describe potential cover settlement and subsidence, considering immediate settlement, primary consolidation, secondary consolidation, and creep and liquefaction. Include the following information:

- Potential foundation comparison;
- Potential soil liner compression; and
- Potential waste consolidation and compression resulting from waste dewatering, biological oxidation and chemical conversion of solids to liquids.

Describe the effects of potential subsidence/settlement on the ability of the final cover to minimize infiltration.

I-1e(3)(g) Cover Permeability: 40 CFR 264.228(a)(2)(iii)(E), 264.310(a)(5)

Demonstrate that the final cover system will have a permeability less than or equal to that of the bottom liner system or natural subsoils present.

I-1e(3)(h) Freeze/Thaw Effects: 40 CFR 264.228(a)(2)(iii), 264.310(a)

Identify the average depth of frost penetration and describe the effects of freeze/thaw cycles on the cover.

I-1e(4) Closure of Containers: 40 CFR 264.178, 264.112(b)(3), 270.14(b)(13)

Show that at closure, all hazardous waste and hazardous waste residues will be removed from the containment system, and how remaining containers, liners, bases, and soil containing or contaminated with hazardous waste or hazardous waste residues will be decontaminated or removed. The description should address the following:

- Hazardous waste removal and disposal;
- Container decontamination and disposal;
- Site decontamination and disposal including liners, soil and washes;
- Verification of decontamination; and
- Maximum inventory.

I-1e(5) Closure of Tanks: 40 CFR 270.14(b)(13), 264.197, 264.112(b)(3)



Describe how all hazardous waste residues, contaminated containment system components (liners, etc.), contaminated soils and structures and equipment contaminated with waste will be removed or decontaminated at closure and managed as hazardous waste.

- Waste removal from tanks and equipment;
- Decontamination of all components;
- Verification of decontamination;
- Disposal of wastes and residues; and
- Maximum inventory.

If not all contaminated soils can be practicably removed or decontaminated at closure, provide for closure and post-closure of the tank system as a landfill. Tank systems that do not have secondary containment that meets the requirements of 264.193(b) through (f), and are not exempt from the secondary containment requirements in accordance with 264.193(g), also must provide a contingent closure plan for closure as a landfill and a contingent post-closure plan.

I-1e(6) Closure of Waste Piles: 40 CFR 270.18(h), 264.258

Describe how all hazardous waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate will be removed or decontaminated at closure and managed as hazardous waste. The description must address the following:

- Procedure and criteria for determining whether or not decontamination has been successful; and
- Sampling and analytical techniques.

If not all contaminated soils can be practicably removed or decontaminated at closure, provide plans for closing the waste pile as a landfill [I-1e(9)] and provide post-closure plan [I-2]. Waste piles without liners or with liners that do not meet the requirements of D-3c must also provide contingent plans for closing the facility as a landfill [I-1e(9)] and a contingent post-closure plan [I-2], except for dry, enclosed waste piles meeting the requirements of D-3b(1) or waste piles for which a liner exemption is sought in accordance with checklist Sections D-3b(2), D-3b(3), and D-3b(4).

I-1e(7) Closure of Surface Impoundments: 40 CFR 270.17(f), 264.228(a)(1), (2) and (b)

Describe how all hazardous waste residues, contaminated containment system components (liners, etc.), contaminated subsoils, and structures and equipment contaminated with waste and leachate will be removed or decontaminated at closure and managed as hazardous waste. The description must address the following:

- Procedure and criteria for determining whether or not decontamination has been successful;
- Sampling and analytical techniques; and
- Continuance of treatment during closure (if appropriate).

If any wastes, waste residues or contaminated materials or soils will remain after closure, provide plans for closing the surface impoundment in place and provide post-closure plans [I-2]. Plans for closing a surface impoundment in place must address the following:

- Elimination of liquids by removal or solidification;
- Stabilization of wastes to sufficient bearing capacity; and
- Final cover designed and constructed to provide long-term minimization of migration of liquids through the closed impoundment, function with minimal maintenance, promote drainage and minimize erosion of final cover, accommodate settling and subsidence, and have a permeability less than or equal to that of the bottom liner system or natural subsoils present.

Surface impoundments without liners or with liners that do not meet the requirements of D-4c must also provide contingent plans for closure in place and a contingent post-closure plan [I-2], except for impoundments requesting a liner exempt in accordance with D-4b.

I-1e(8)      Closure of Incinerators: 40 CFR 264.351, 270.14(b)(13)

Describe how, at closure, all hazardous waste and hazardous waste residues (including, but not limited to ash, scrubber waters, and scrubber sludges) will be removed from the incinerator, associated ductwork, piping, air pollution control equipment, sumps, and any other structures or operating equipment such as pumps, valves, etc., that have come into contact with the hazardous waste. Alternatively, describe how the incinerator and associated units and equipment will be dismantled and disposed of as a hazardous waste.

I-1e(9)      Closure of Landfills: 40 CFR 270.21(e), 264.310(a)

Provide detailed plans and an engineering report that describes the final cover components in detail. Cover installation and construction quality assurance procedures should be thoroughly described. These detailed plans and engineering report must describe how the final cover will:

- Provide long-term minimization of migration of liquids through the closed landfill;
- Function with minimum maintenance;
- Promote drainage and minimize erosion/abrasion;
- Settle/subside without losing integrity;
- Be less permeable than bottom liners and subsoil; and
- Withstand freeze/thaw cycles.

I-1e(10)      Closure of Land Treatment Facilities: 40 CFR 264.280(a), 270.20(f)

I-1e(10)(a)      Continuance of Treatment: 40 CFR 264.280(a)(1) through (7)

Describe how, during the closure period, all operations (including pH control) necessary to maximize degradation, transformation and immobilization of hazardous constituents within the treatment zone will be continued. Include a description of how, during the closure period, run-off of hazardous constituents will be minimized, and how run-on, run-off and wind dispersal control systems will be maintained. Demonstrate that compliance with any prohibitions or conditions concerning growth of food-chain crops will be continued. Demonstrate that unsaturated zone monitoring also will be continued.

When closure is complete, submit certification to the Regional Administrator by an Independent qualified soil scientist, in lieu of an independent registered professional engineer, that the facility has been closed in accordance with the specifications in the approved closure plan.

I-1e(10)(b) Vegetative Cover: 40 CFR 270.20(f), 264.280(a)(8)

Describe the vegetative cover to be established during closure, including:

- Common name, species and variety of the cover crop to be established;
- Data showing that the cover crop can thrive in the soils and climate in which it will be placed;
- The minimum percentage of soil cover to be maintained on the closed land treatment unit; and
- Methods to be used to establish and maintain the cover.

I-1e(11) Closure of Miscellaneous Units: 40 CFR 270.23(a)(2)

Show that at closure, all hazardous waste and hazardous waste residues will be removed from the treatment process or equipment, discharge control equipment, and discharge confinement structures, and that the unit be decontaminated. Description of the sampling/test procedures or other means used to ensure that no contamination remains on, in or around the units and associated equipment and structures. If any wastes, wastes residues or contaminated materials or soils will remain after closure, provide plans for closing the miscellaneous unit as a disposal unit [I-1e(2)] and provide post-closure plans [I-2].

I-1e(12) Closure of Boilers and Industrial Furnaces (BIFs): 40 CFR 266.102(a)(2)(vii)

Describe how, at closure, all hazardous waste and hazardous waste residues (including, but not limited to, ash, scrubber waters, and scrubber sludges) will be removed from the BIF unit, associated ductwork, piping, air pollution control equipment, sumps, and any other structures or operating equipment such as pumps, valves, etc., that have come into contact with hazardous wastes. Alternately, describe how the BIF and associated equipment will be dismantled and disposed of. If any wastes, waste residues, contaminated components, subsoils, structures or equipment remain after closure, provide plans for closing the BIF unit as a landfill and provide a post-closure care plan.

I-1e(13) Closure of Containment Buildings: 40 CFR 264.1102

Show that at closure all hazardous wastes, hazardous waste residues, contaminated containment system, contaminated subsoils, and all structures and equipment contaminated with waste and leachate will be removed. If any wastes, wastes residues, contaminated components, subsoils, structures or equipment remain after closure, provide plans for closing the containment building as a landfill and provide a post-closure care plan.

I-2                    Post-Closure Plan/Contingent Post-Closure:    40 CFR 270.14(b)(13), 270.17(f), 270.18(h), 270.20(f), 270.21(e), 270.23(a)(3), 264.118, 264.197(b), 264.197(c)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.280(c), 264.310(b), 264.603

Submit a copy of the most recent post-closure plan or, if applicable, the contingent post-closure plan. Landfill, surface impoundment, waste pile, and tank post-closure plans should address items I-2a, b, c, f, g, h; land treatment unit post-closure plans, items I-2d, f, g, and h; miscellaneous units should address items I-2a, b, c, e, f, g, and h.

I-2a                    Inspection Plan:    40 CFR 264.118(a), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.303(c), 264.310(b)

Describe the inspections to be conducted during the post-closure care period, their frequency, the inspection procedure, and the logs to be kept. the following items, as applicable, must be included in the inspection plan:

- Security control devices;
- Erosion damage;
- Cover settlement, subsidence and displacement;
- Vegetative cover condition;
- Integrity of run-on and run-off control measures;
- Cover drainage system functioning;
- Leachate collection/detection and removal system;
- Gas venting system;
- Well condition; and
- Benchmark integrity.

The rationale for determining the length of time between inspection should be provided.

I-2b                    Monitoring Plan:    40 CFR 264.118(b)(1), 264.197(b), 264.197(c)(2), 264.226(d)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.303(c), 264.310(b)

Describe the monitoring to be conducted during the post-closure care period, including, as applicable, the procedures for conducting the following operations and evaluating the data gathered:

- Groundwater monitoring; and
- Leachate collection/detection and removal.

I-2c      Maintenance Plan: 40 CFR 264.118(b)(2), 264.197(b), 264.197(c)(2), 264.228(b), 264.228(c)(1)(ii), 264.258(b), 264.258(c)(1)(ii), 264.310(b)

Describe the preventative and corrective maintenance procedures, equipment procedures, equipment requirements and material needs. Include the following items in the maintenance plan, as applicable:

- Repair of security control devices;
- Erosion damage repair;
- Correction of settlement, subsidence and displacement;
- Mowing, fertilization and other vegetative cover maintenance;
- Repair of run-on and run-off control structures;
- Leachate collection/detection system maintenance;
- Well repair/replacement; and
- Protect and maintain surveyed benchmarks.

Describe the rationale to be used to determine the need for corrective maintenance activities.

I-2d      Land Treatment: 40 CFR 264.280(c)

Describe the operation, inspection, and maintenance programs to be used at the closed facility. Include descriptions of the procedures for conducting the following activities and identify frequencies at which they are to be conducted:

- Continuance of land treatment;
- Vegetative cover maintenance;
- Maintenance of run-on control systems and run-off management systems;
- Wind dispersal control;
- Control of food chain crops; and
- Unsaturated zone monitoring.

I-2e      Post-Closure Care for Miscellaneous Units: 40 CFR 270.23(a)(3), 264.603

Specify procedures including in the post-closure plan for miscellaneous units that are disposal units or treatment or storage units where contaminated soils or groundwater cannot be completely removed or decontaminated that ensures performance standards established per 264.601 will be maintained through the post-closure period. Include the prevention of any releases to groundwater or subsurface environment; surface water or wetlands or on the soil surface; or to air, as appropriate.

I-2f      Post-Closure Security: 40 CFR 264.117(b) and (c)

Indicate whether hazardous wastes will remain exposed after completion of partial or final closure or access by the public or domestic livestock may pose a hazard to human health. Demonstrate that for property where hazardous wastes remain after partial or final closure, post-closure use must never be allowed to disturb the integrity of the final

cover, liner(s), or any other components of the containment system, or the function of the facility's monitoring system.

I-2g Post-Closure Contact: 40 CFR 264.118(b)(3)

Provide the name, address, and phone number of the person or office to contact about the hazardous waste disposal unit or facility during the post-closure care period.

I-3 Notices Required for Disposal Facilities

I-3a Certification of Closure: 40 CFR 264.115, 264.280

Provide a statement that indicates that within 60 days of completion of closure of each hazardous waste surface impoundment, waste pile, land treatment, and landfill unit, and within 60 days of the completion of final closure, closure certification will be submitted to the Regional Administrator. The certification must certify that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications of the approved closure plan. The certification must be signed by the owner/operator and by an independent registered professional engineer (or by an independent qualified soil scientist in the case of a land treatment closure).

I-3b Survey Plat: 40 CFR 264.116

Provide a statement that indicates that no later than the submission of certification of closure of each hazardous waste disposal unit, a survey plat indicating the location and dimensions of landfill cells or other disposal units with respect to permanently surveyed benchmarks, will be submitted to the local zoning authority (or authority with jurisdiction over local land use) and to the Regional Administrator. The plat must be prepared and certified by a professional land surveyor and must contain a note, prominently displayed, that states the owner/operator obligation to restrict disturbance of the disposal unit in accordance with applicable 40 CFR Subpart G regulations.

I-3c Post-Closure Certification: 40 CFR 264.120

Provide a statement that indicates that within 60 days of completion of the post-closure care period for each hazardous waste disposal unit, certification will be submitted to the Regional Administrator. The certification must certify that the post-closure care period for the hazardous waste disposal unit was performed in accordance with the specifications of the approved post-closure plan. The certification must be signed by the owner/operator and by an independent registered professional engineer.

I-3d Post-Closure Notices: 40 CFR 270.14(b)(14), 264.119

Provide a statement that indicates that the following post-closure notices will be appropriately filed and submitted:

- A record of the type, location, and quantity of hazardous wastes disposed of within each cell or other disposal unit will be submitted to the local zoning

authority (or the authority with jurisdiction over local land use) and to the Regional Administrator no later than 60 days after certification of closure of each disposal unit.

- A notation in the deed to the facility property will be made that will, in perpetuity, notify any potential purchasers of the property that (1) the land has been used to manage hazardous waste; (2) use of the land is restricted to activities that will not disturb integrity of the final cover system, or monitoring system during post-closure care period; and (3) the survey plat (item I-3b) and record of waste disposal (noted above) have been submitted to the local zoning authority (or the authority with jurisdiction over local land use) and to the Regional Administrator. This notation must be placed within 60 days of certification of closure of the first waste disposal unit and within 60 days of certification of closure of the last waste disposal unit.
- A certification, signed by the owner/operator, that the notice in the deed has been made, must be submitted to the Regional Administrator.

I-4

Closure Cost Estimate: 40 CFR 270.14(b)(15), 329 IAC 3.1-15-3

Provide a copy of the most recent closure cost estimate, considering the following factors:

- The estimate must equal the cost of final closure at the point at which facility closure would be most costly;
- The cost estimate must be based on having a third party close the facility;
- The estimate may use costs of on-site disposal if capacity will exist at all times over the life of the facility;
- The estimate may not incorporate salvage value realized from the site of hazardous wastes, facility structures/equipment, land, or other facility assets;
- The estimate may not assume zero costs for handling of hazardous wastes with potential economic value; and
- The cost estimate must be adjusted annually for inflation pursuant to 329 IAC 3.1-15-3(b).

The closure cost estimate should include costs for the following activities:

- Removal of waste inventory;
- Decontamination and/or removal of facility equipment;
- Disposal of wash water/cleaning waste;
- Sampling and analysis;
- Restoration of facility equipment and site;
- Certification of closure;
- Remediation of contaminated soil;
- Disposal of facility equipment; and
- Contingency fee (10 - 25% depending on unit type and number. See OSWER Policy Directive 9476.00-6).

I-5

Financial Assurance Mechanism for Closure: 40 CFR 270.14(b)(15), 329 IAC 3.1-15-4, 3.1-15-10

Provide a copy of the established financial assurance mechanism for facility closure. The mechanism must be one of the following:

I-5a      Closure Trust Fund: 329 IAC 3.1-15-4(b), 3.1-15-10(a)

Provide a copy of the closure trust fund agreement as specified in 3.1-15-10(a) and formal certification of acknowledgment.

I-5b      Surety Bond: 329 IAC 3.1-15-4(c), 3.1-15-10(b) and (c)

I-5b(1)    Surety Bond Guaranteeing Payment Into a Closure Trust Fund: 329 IAC 3.1-15-4(c), 3.1-15-10(b)

Provide a copy of the surety bond with the wording required by 3.1-15-10(b) and a copy of the standby trust agreement. The bond must guarantee that the owner or operator will fund the standby trust in an amount equal to the penal sum of the bond before the beginning of final closure of the facility, or fund the standby trust fund in an amount equal to the penal sum within 15 days of an order to begin closure, or provide alternate financial assurance if the bond is canceled.

I-5b(2)    Surety Bond Guaranteeing Performance of Closure: 329 IAC 3.1-15-4(d), 3.1-15-10(c)

Provide a copy of the surety bond with the wording required by 3.1-15-10(c), guaranteeing that the owner or operator will perform closure according to the closure plan and the requirements of 40 CFR 264, Subpart G.

I-5c      Closure Letter of Credit: 329 IAC 3.1-15-4(e), 3.1-15-10(d)

Provide a copy of the irrevocable letter of credit with the wording required by 3.1-15-10(d) and a copy of the standby trust agreement. The letter of credit must be issued for a period of at least one year and be for the amount of estimated closure.

I-5d      Closure Insurance: 329 IAC 3.1-15-4(f), 3.1-15-10(e)

Provide a copy of the certification of insurance with the wording required in 3.1-15-10(e).

I-5e      Financial Test and Corporate Guarantee for Closure: 329 IAC 3.1-15-4(g), 3.1-15-10(f), (g), and (h)

Submit a letter signed by the owner's or operator's chief financial officer and worded as specified by 3.1-15-10(f) or (g), a copy of independent certified public accountant's report on examination of the applicant's financial statements for the last fiscal year, and a special report from the certified public accountant. If a parent company is guaranteeing closure for a subsidiary facility, the corporate guarantee must accompany the preceding items.

I-5f      Use of Multiple Financial Mechanisms: 329 IAC 3.1-15-4(h)



Provide a copy of a combination of trust fund agreements, surety bonds guaranteeing payment into a closure trust fund, letters of credit, or insurance, together that provide financial assurance for the amount of closure. Combined financial assurance must be at least equal to the adjusted closure cost estimate. Financial assurance instruments must meet requirements 3.1-15-4(b), (c), (e) or (f) that include closure trust fund, surety bond guaranteeing payment into a closure trust fund, closure letter of credit, and closure insurance, respectively.

I-5g      Use of Financial Mechanism for Multiple Facilities: 40 CFR 264.143(i)

Provide a copy of a financial assurance mechanism for more than one facility showing, for each facility, the EPA ID number, name address, and amount of funds closure assured by the mechanism. The amount of funds available through the mechanism must be no less than the sum of funds that would be available is a separate mechanism had been established and maintained for each facility. Documents must be submitted to each Region where facilities are located. Financial test applies to sum of closure and post-closure costs for all facilities.

I-6      Post-Closure Cost Estimate: 40 CFR 270.14(b)(16), 329 IAC 3.1-15-5

For landfill, land treatment, surface impoundments, or waste pile units, provide a copy of the most recent post-closure cost estimate, calculated to cover the cost, in current dollars, of post-closure monitoring and maintenance of the facility in accordance with the applicable post-closure plan. The post-closure cost estimate must be based on the costs of having a third party perform the post-closure activities. The cost estimate must be adjusted annually for inflation pursuant to 329 IAC 3.1-15-5(b).

I-7      Financial Assurance Mechanism for Post-Closure Care: 40 CFR 270.14(b)(16), 329 IAC 3.1-15-6, 3.1-15-10

Provide a copy of the established financial agreement mechanism for post-closure care of the facility. The mechanism must be on of the following:

I-7a      Post-Closure Trust Fund: 329 IAC 3.1-15-6(b), 3.1-15-10(a)

Provide a copy of the post-closure fund agreement with the wording required by 3.1-15-10(a) and submit a formal certification of acknowledgment.

I-7b      Surety Bond: 329 IAC 3.1-15-6(c) and (d), 3.1-15-10(b) and (c)

I-7b(1)      Surety Bond Guaranteeing Payment Into a Post-Closure Trust Fund: 329 IAC 3.1-15-6(c), 3.1-15-10(b)

Provide a copy of the surety bond with the wording required by 3.1-15-10(b) and a copy of the standby trust agreement. The bond must guarantee that the owner or operator will fund the standby trust fund in an amount equal to the penal sum of the bond before the beginning of final closure of the facility, or fund the standby trust funding an amount

equal to the penal sum within 15 days of an order to begin closure, or provide alternative financial assurance if the bond is canceled.

- I-7b(2) Surety Bond Guaranteeing Performance of Post-Closure Care: 329 IAC 3.1-15-6(d), 3.1-15-10(c)

Provide a copy of the surety bond with the wording required by 3.1-15-10(c), guaranteeing that the owner or operator will perform post-closure care according to the post-closure plan and the requirements of 40 CFR 264, Subpart G.

- I-7c Post-Closure Letter of Credit: 329 IAC 3.1-15-6(e), 3.1-15-10(d)

Provide a copy of the irrevocable letter of credit with the wording required by 3.1-15-10(d) and a copy of the standby trust agreement. The letter of credit must be issued for a period of at least one year and be for the amount of estimated post-closure costs.

- I-7d Post-Closure Insurance: 329 IAC 3.1-15-6(f), 3.1-15-10(e)

Provide a copy of the certificate of insurance with the wording required by 3.1-15-10(e).

- I-7e Financial Test and Corporate Guarantee for Post-Closure Care: 329 IAC 3.1-15-6(g), 3.1-15-10(f), (g) and (h)

Submit a letter signed by the owner's or operator's chief financial officer and worded as specified by 3.1-15-10(f) or (g), a copy of the independent certified public accountant's report on examination of the applicant's financial statements for the latest fiscal year, and a special report from the certified public accountant. If a parent corporation is guaranteeing post-closure care for a subsidiary facility, the corporate guarantee must accompany the preceding items.

- I-7f Use of Multiple Financial Mechanisms: 329 IAC 3.1-15-6(h)

Provide a copy of a combination of financial mechanisms, including trust fund agreements, surety bonds guaranteeing payment into a post-closure trust fund, letters of credit, and insurance, together which provide financial assurance for the amount of post-closure care. Combined financial assurance must be at least equal to the adjusted post-closure cost estimate.

- I-7g Use of Financial Mechanism for Multiple Facilities: 329 IAC 3.1-15-10(i)

Provide a copy of a financial assurance mechanism for more than one facility showing, for each facility, the EPA ID number, name address, and amount of post-closure funds assured by the mechanism. The amount of funds available through the mechanism must be no less than the sum of funds that would be available if a separate mechanism had been established and maintained for each facility.

- I-8 Liability Requirements: 40 CFR 270.14(b)(17), 329 IAC 3.1-15-8

Provide copies of the required items documenting compliance with applicable liability requirements for sudden and nonsudden accidental occurrences.

I-8a      Coverage for Sudden Accidental Occurrences: 329 IAC 3.1-15-8(a)

For hazardous waste treatment, storage, or disposal facilities, liability coverage must be maintained for sudden accidental occurrences in the amount of at least \$1 million per occurrence with an annual aggregate of at least \$2 million. Liability coverage may be demonstrated in one of three ways:

I-8a(1)      Endorsement of Certification: 329 IAC 3.1-15-8(a)(1)

Submit a signed duplicate original of the Hazardous Waste Facility Liability Endorsement, with the wording specified by 3.1-15-10(i), or of a Certificate of Liability Insurance, with the wording specified by 3.1-15-10(j).

I-8a(2)      Financial Test or Corporate Guarantee for Liability Coverage: 329 IAC 3.1-15-8(a)(2), 3.1-15-8(e)

Submit a letter signed by the owner's or operator's chief financial officer and worded as specified by 3.1-15-8(e)(3), a copy of the independent certified public accountant's report on examination of the applicant's financial statements for latest fiscal year, and a special report from the certified public accountant. If the applicant is using the financial test to demonstrate both assurance for closure or post-closure care and liability, the letter specified in 3.1-15-8(e)(3) must be submitted to cover both forms of financial responsibility. Under these circumstances, a separate letter as specified in 3.1-15-10(f) is not required. Alternately, the owner/operator may submit a corporate guarantee with wording identical to the wording specified in 3.1-15-8(f).

I-8a(3)      Use of Multiple Insurance Mechanisms: 329 IAC 3.1-15-8(a)(3)

Submit items demonstrating required liability coverage through a combination of endorsement or certification and financial test or a combination of endorsement or certification and corporate guarantee as these mechanisms are specified in I-8a(1) and I-8a(2). The amounts of coverage demonstrated must total at least the minimum amounts required by 3.1-15-8(a).

I-8b      Coverage for Nonsudden Accidental Occurrences: 329 IAC 3.1-15-8(b)

For surface impoundments, land disposal, and land treatment facilities, liability coverage must be maintained for nonsudden accidental occurrences in the amount of at least \$3 million per occurrence with an annual aggregate of at least \$6 million. Liability coverage may be demonstrated in one of three ways:

I-8b(1)      Endorsement or Certification: 329 IAC 3.1-15-8(b)(1)

Submit a signed duplicate original of the Hazardous Waste Facility Liability Endorsement, with the wording specified by 3.1-15-10(i), or a Certificate of Liability Insurance, with the wording specified by 3.1-15-10(j).

- I-8b(2) Financial Test or Corporate Guarantee for Liability Coverage: 329 IAC 3.1-15-8(b)(2), 3.1-15-8(e) and (f), 3.1-15-10(f) and (g)

Submit a letter signed by the owner's or operator's chief financial officer and worded as specified by 3.1-15-10(g), a copy of the independent certified public accountant's report on examination of the applicant's financial statements for the latest fiscal year, and a special report from the certified public accountant. If the applicant is using the financial test to demonstrate both assurance for closure or post-closure care and liability coverage, the letter specified in 3.1-15-10(g) must be submitted to cover both forms of financial responsibility. Under these circumstances, a separate letter as specified by 3.1-15-10(f) is not required. Alternately, the owner/operator may submit a corporate guarantee with wording identical to the wording specified in 3.1-15-8(f).

- I-8b(3) Use of Multiple Insurance Mechanisms: 329 IAC 3.1-15-8(b)(3)

Submit items demonstrating required liability coverage through a combination of endorsement or certification and financial test or a combination of endorsement or certification and corporate guarantee as these mechanisms are specified in I-8b(1) and I-8b(2). The amounts of coverage demonstrated must total at least the minimum amounts required by 3.1-15-8(b).

- I-8c Request for Variance: 329 IAC 3.1-15-8(b)(4)(C)

Request for an adjusted level of required liability coverage must be accompanied by supporting information to demonstrate that established levels of financial responsibility specified in 3.1-15-8(a) or (b) are not consistent with the degree and duration of risk associated with treatment, storage, or disposal at the applicant's facility or group of facilities.

- I-9 Use of State-Required Mechanisms: 40 CFR 270.14(b)(18)

- I-9a Use of State-Required Mechanisms: 40 CFR 270.14(b)(18)

Where a state has hazardous waste regulations with equivalent or greater liability requirements for financial assurance for closure and post-closure care, provide a copy of the state-required financial mechanisms, including the facility EPA ID number, name, address, and amounts of coverage and a letter requesting that the state mechanism be considered acceptable.

- I-9b State Assumption of Responsibility: 40 CFR 270.14(b)(18)

If a state assumes legal responsibility for compliance with closure, post-closure, or liability requirements, or the state assures that state funds are available to cover those requirements, submit a copy of a letter from the state describing the state assumption of

responsibility and including the facility EPA ID number, name, address, and amounts of liability coverage or funds for closure or post-closure care that are assured by the state, together with a letter requesting that the state's assumption of responsibility be considered acceptable.

**J. CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS:**

[Note: Section E should be used for review of groundwater monitoring and related corrective actions for regulated landfills, surface impoundments, waste piles, and land treatment units. For corrective actions at other solid waste management units, use Section J.]

J-1 Solid Waste Management Units: 40 CFR 270.14(d)(1), 264.101

Identify all solid waste management units at the facility including hazardous and non-hazardous waste units, as well as active and inactive units, if known. A solid waste management unit may include any of the following:

- Landfill;
- Surface impoundments;
- Waste pile;
- Land treatment unit;
- Tank (including 90-day accumulation tank);
- Injection well;
- Incinerator;
- Wastewater treatment tank;
- Container storage area;
- Waste handling area;
- Transfer station; and
- Waste recycling operations.

J-1a Characterize the Solid Waste Management Unit

For each solid waste management unit, submit the following information:

- Type of each unit;
- Location of each existing or closed unit on the topographic map. [See comment B-2.];
- Engineering drawings for each unit, if available;
- Dimensions and materials of construction of each unit;
- Dates when the unit was in operation;
- Description of the wastes placed in each unit; and
- Quantity or volume of waste, if known.

J-1(b) No Solid Waste Management Units:

Describe the methodology used to determine that no existing or former solid waste management units exist at the facility (e.g., review of old solid waste permits, blueprints).

J-2

Releases

Provide all information available, including releases reported under CERCLA §103, on whether or not any releases have occurred from any of the solid waste management units at the facility. Reasonable efforts to identify releases must be made, even if releases have not been verified. (A release may include: spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment. It does not include releases otherwise permitted or authorized under law or discharges into the injection zone of a UIC permitted class I injection well.)

J-2a

Characterize Releases

Information on releases must include the following types of available information concerning prior current releases:

- Date of the release;
- Type of waste or constituent released;
- Quantity or volume released;
- Nature of the release;
  - spill,
  - overflow,
  - ruptured pipe or tank,
  - result of the unit's construction (e.g., unlined surface impoundment, leaky tank),
  - other.
- Groundwater monitoring and other analytical data available to describe nature and extent of release. If other than groundwater monitoring data, please describe:
  - Physical evidence of distressed vegetation or soil contamination;
  - Historical evidence of releases such as tanker truck accidents;
  - Any state, local or federal enforcement action that may address releases;
  - Any public citizen complaints about the facility that could indicate a release; and
  - Any information showing the migration of the release.

J-2b

No Releases

Describe the methodology used to determine that releases from solid waste management units are not present (e.g., review of groundwater monitoring data).

**K.**

**OTHER FEDERAL LAWS:** 40 CFR 270.14(b)(20), 270.3

Demonstrate compliance with the requirements of applicable Federal laws such as the Wild and Scenic Rivers Act, National Historic Preservation Act of 1966, Endangered Species Act, Coastal Zone Management Act, and Fish and Wildlife Coordination Act.

**L.            PART B CERTIFICATION: 40 CFR 270.11**

Application must be accompanied by a certification letter as specified in 270.11(d). The required signatures are as follows: (1) for a corporation, a principal executive officer (at least at the level of vice-president); (2) for a partnership or sole proprietorship, a general partner or the proprietor, respectively; (3) for a municipal, state, Federal, or other public agency, either a principal executive officer or ranking elected official.

C:\Documents and Settings\kpurtell\Local Settings\Temp\Pt B Comments.wpd